

TITLE: RESIDENTIAL PASSIVE SOLAR SYSTEMS: REGIONAL SENSITIVITY
TO SYSTEM PERFORMANCE COSTS, AND ALTERNATIVE PRICES

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**RESIDENTIAL PASSIVE SOLAR SYSTEMS:
REGIONAL SENSITIVITY TO SYSTEM PERFORMANCE
COSTS, AND ALTERNATIVE PRICES**

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1. ABSTRACT

The economic potential of two passive space heating configurations are analyzed. These are a masonry thermal storage wall (Trombe) and a direct gain system--both with night insulation. A standard tract home design for each of the two passive systems is being used throughout the analysis to allow inter-regional comparisons. The economic performance of these two systems is evaluated on a regional basis (223 locations) throughout the United States. For each of the two conventional energy types considered (electricity and natural gas), sensitivity analysis is conducted to determine the impact of alternative fuel price escalation rates and solar costs upon feasibility of the two solar systems.

Cost goals for solar system prices are established under one set of future fuel prices and stated economic conditions. These cost goals define maximum allowable solar add-on expenditures for each location against likely conventional space heating fuels and their associated prices. Cost goals are determined for three alternative periods of ownership; 7, 15, and 30 years.

Alternatively, we examine future fuel price requirements (given solar feasibility) under stated add-on cost expenditures. Future fuel price requirements are defined as those energy costs which must be realized for the allowable, add-on solar costs to be achieved under competitive conditions. The escalation rates needed to bring present energy costs to the established minimum levels are location specific. As for cost goals, these escalation rates are defined for the three alternative periods of home ownership.

2. INTRODUCTION

Solar energy use in residential heating applications has been the focus of much discussion over the last several years. Divergent views [1] and conflicting results [2,3] from various economic "models" have left the issue of the near-term future of solar energy unresolved at best. (There has, however, been little disagreement as to its (solar) desirability.) Much of this confusion cannot be eliminated, for the future itself is uncertain. However, many of the questions and concerns of potential solar consumers can be addressed in a fairly straightforward and systematic manner. The overall issue of economic competitiveness or feasibility is the subject of this paper.

There are four basic types of information used in any assessment of solar energy economics. The first, physical performance, estimates the fraction of space heating demand provided by the solar system/design. A second information

need is price, both current and future, of the conventional fuel being displaced. The third is information on construction costs and the fourth is information on the financial climate facing consumers. These four types of information are integrated in some form of life cycle costing and/or cash flow analysis to estimate, or project, the future of solar for residential home owners.

Our approach to evaluating the economics of solar allows one to establish goals or targets for each of the categories of information defined above. An example should assist in understanding this procedure. Let's presume that solar performance, conventional fuel prices, and the financial climate (e.g., mortgage rate and length of loan) are known or can be specified. The unknown variable is the cost of constructing this design (if passive) or system (if active) on an individual home. By establishing cost targets it is no longer required that we know precisely the add-on costs of the solar system. Rather, it would be sufficient to know (or establish) that the quoted add-on cost falls somewhat below the needed cost target or goal to ensure that the solar investment is feasible. By further restricting the investment criteria by establishing bounds on payback periods, additional mortgage payment limits, or minimum levels of fuel (and thus dollar) savings, the cost target/goal can be recomputed and the boundaries on solar investment can be narrowed. If the dollar estimates of solar costs are substantially below these "breakeven" targets, then it may be said that there is little uncertainty or risk involved in undertaking that solar investment.

It is possible to carry this example further by examining the situation where one of the four types of information is "less known" than the remaining three sets. By establishing two sets of targets--maximum solar add-on cost and minimum annual fuel escalation rates to just "breakeven" in the life cycle costing sense--it is hoped that the concern for precision over these values can be reduced in some cases (where today's figures are significantly different than the established targets) and focused on others (where today's figures are fairly close to established targets). Further, by examining these cost and escalation rate targets under varying assumptions about home ownership time periods--and thus capturing one of the primary concerns of solar residential investors--the potential sensitivity to present day solar costs and projected conventional fuel escalation rates can be easily assessed. Thus we can evaluate the sensitivity of specific parameters without resorting to elaborate mathematical expressions and/or a large number of computer simulation runs. By comparing these targets/goals with present values (e.g., fuel escalation rates as projected by DOE or others and actual construction cost estimates from builders) a good assessment can be made as to how close to economic competitiveness solar may or may not be. Through examination of these established targets and their movement as "known" economic and physical conditions change it will be possible to judge how realistic consumers' (or government's) expectations on solar feasibility may be.

In the following sections we evaluate some of the economic conditions necessary for passive solar energy to compete in the new home residential market. It is important to note that the target cost methodology and computational procedures used are as important as the actual results. Two solar designs are evaluated and then contrasted against the two major fuels responsible for meeting the bulk of today's space heating needs in new residential construction: natural gas and electricity. The methodology, computational procedure, and target criteria are carefully outlined in Section 3. Results for 48 locations, one in each of the 48 continental states, are discussed in Section 4. Maps are used to illustrate geographical patterns of regional similarities and differences for selected cost goals and fuel escalation rate targets for the 48 states. Table 3 contains more detailed results for the larger set of geographical loca-

tions (223) for which these analyses have been performed. In Section 5 results are briefly summarized with major conclusions highlighted.

3. METHODOLOGY

Solar performance calculations are key to any solar economic analysis. The feasibility of a given set of criteria, is, in part, defined by the solar displacement of conventional fuel. The solar fraction represents the measure of this displacement and is used to translate solar performance into economic terms. The solar performance data has been developed from the modified load to collector area ratio (LCR) correlation procedures developed by Los Alamos Scientific Laboratory (LASL) [4]. The estimates are based on specific design parameters. The Trombe wall design assumes 18 inches of mass (1.5 cubic feet of mass per foot squared of aperture). The LCR's for the Trombe wall design have been shown to be nearly identical for all variations of thickness from 12 inches to 18 inches in most locations in the United States. The direct gain design used here incorporates all of the required collector area into south facing windows (no clerestory windows) and assumes 1.5 cubic feet of mass per foot squared of south facing glass. The night insulation for both systems has an assumed R-value of 9. The LCR's are used in conjunction with estimated home heating loads to calculate a collector area requirement for each solar fraction.

The LCR estimates represent the heating load to collector area ratio where heating load is defined as the load other than that on the south collector area of the home. If the opaque south wall is neutral in terms of heat loss/heat gain the collector area is calculated as follows:

$$CA = \frac{LOSW}{LCR}$$

where:

$$\begin{aligned} LOSW &= \text{load other than that on the south collector area} \\ &= HLF * RESSF - AMAX * UB * 24 \end{aligned}$$

and where:

HLF = heat loss factor of a conventional base case home including losses through the south wall (location and design specific)
(BTU/DD = ft² res.)

RESSF = ft² residence

AMAX = area of south wall exposure (ft²)

UB = maximum allowable U-factor through walls (BTU/hr - F° - ft²)

24 = unit correction factor

If the opaque south wall is not neutral in terms of heat gain/heat loss the collector area is calculated as:

$$CA = \frac{LOSW + [(AMAX - CA) * UB * 24]}{LCR}$$

which collapses to:

$$CA = \frac{LOSW + (AMAX * UB * 24)}{LCR + (UB * 24)}$$

The heat loss factors used in the building load calculation, HLF, have been developed on a location by location basis. The heat loss of any building is calculated as the sum of the conductive (transmission losses through the entire building envelope) and the convective (infiltrative losses which occur as a result of infiltration) losses. Maximum allowable U-values are utilized to calculate the conductive losses. Conductive losses are further subdivided into three parts, each corresponding to a portion of the residential building. These are 1) the exterior building envelope 2) floor and 3) ceiling/roof. Convective losses are determined using the crack-length method. The particular residence used in this analysis is of a TEA reference design [5]. It is a one-story slab on grade home with 3 bedrooms, 2 baths and 1536 square feet of living area.

The heat loss factors are calculated such that they are a function of the home design under consideration and the climate of the location. The climate is quantified through the annual average heating degree days measure (65°F base). This parameter is specified for each of the 223 locations.

The heating load of a solar home of specific configuration must also be calculated. The product of the solar home load and the fraction pertaining to that home design gives the amount of conventional energy which is being displaced by the system under consideration. The solar home load (SHLOAD) in millions of Btu's is calculated as:

$$SHLOAD = [LOSW + (AMAX * UVGL * 24)] * DD + \left[\left(\frac{1-F}{F} \right) * CA * UVGL * 24 * DD \right] / 1,000,000.$$

where

UVGL = U-value of non-solar south wall
 DD = heating degree days
 CA = collector area
 F = solar savings fraction
 AMAX = south wall square footage

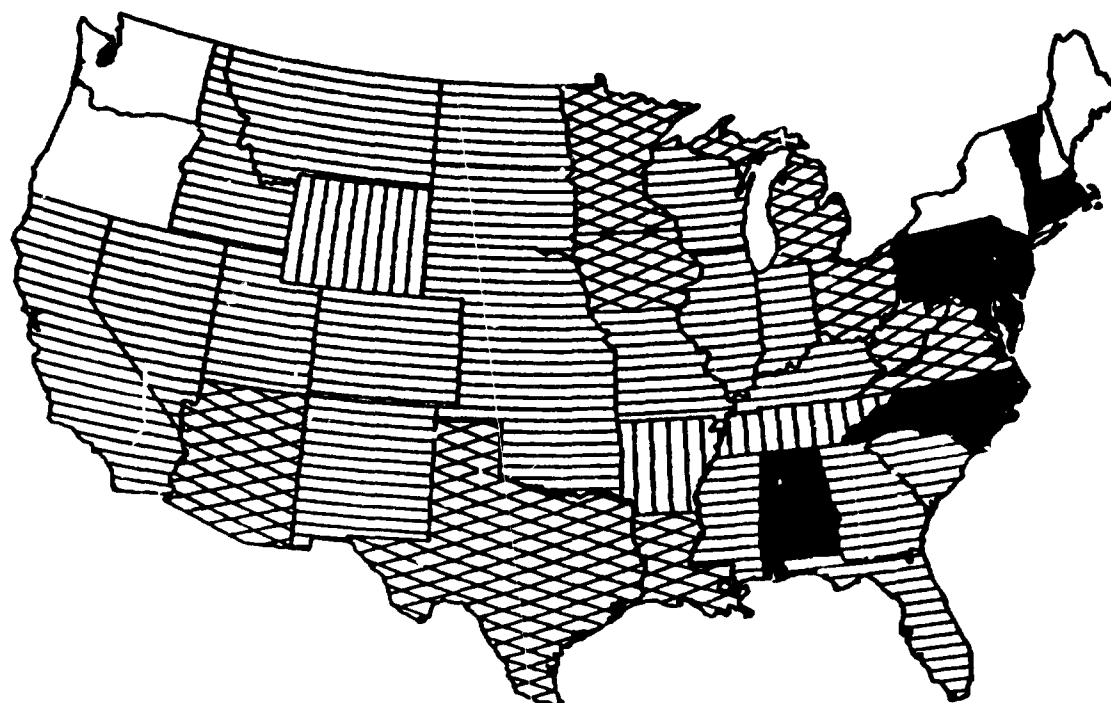
The energy displaced by the solar system is calculated as:

$$F * SHLOAD$$

This translates the performance of the system into a millions of Btu's of conventional energy measure. The application of a price per unit of energy will, in turn, translate this into a dollar savings to the consumer. Fuel prices (1979 base year) were gathered for a large number of cities. Where information was inadequate or wholly lacking a surrogate city was chosen [6]. The fuel price

MAP 1

1979 NATURAL GAS PRICES



DOLLARS PER THOUSAND CUBIC FEET



1.00-1.75



1.76-2.50



2.51-3.25



3.26-4.00

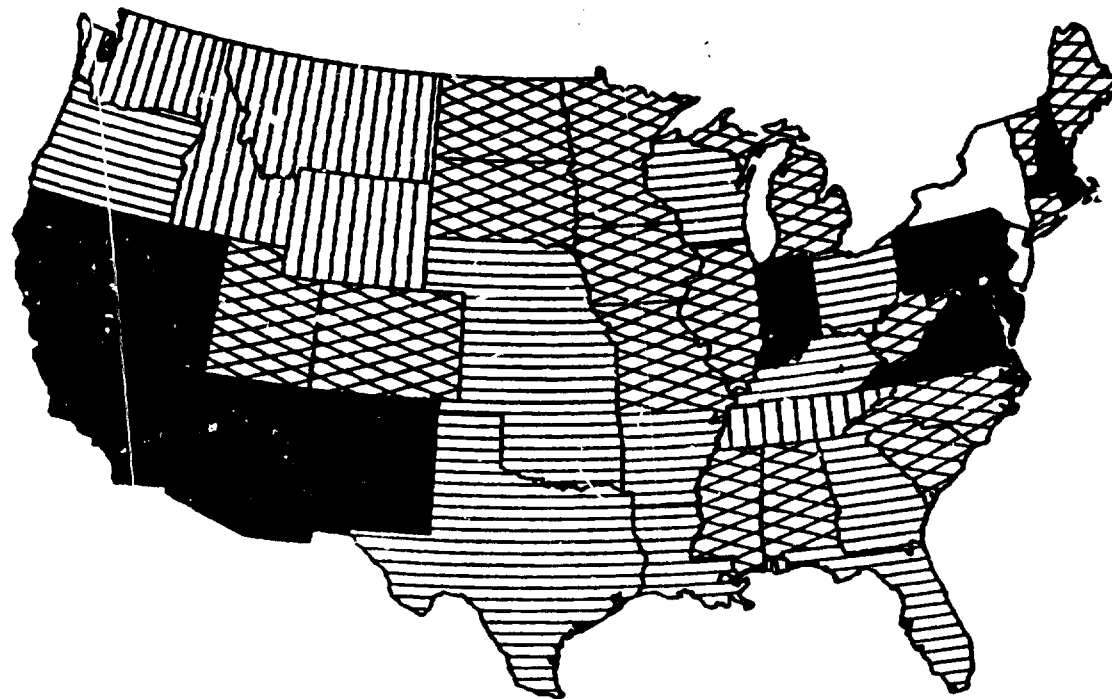


4.01+



MAP 2

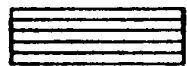
1979 ELECTRICITY PRICES



CENTS PER KILOWATT HOUR



1.0-3.0



3.1-4.0



4.1-5.0



5.1-6.0



6.1+



data base includes 1979 prices for natural gas and electric resistance. Natural gas and electricity prices are displayed on a state-by-state basis on Maps 1 and 2, recorded in the unit type familiar to the consumer - \$/MCF for natural gas, and ¢/kwh for electricity. Two factors are used to convert this cost into a dollars per million Btu cost, a Btu conversion factor (BTUCF) and a furnace efficiency factor (BTUFE). These are shown below:

	BTUCF	BTUFE
Gas	1.0 MMBtu/MCF	.75
Electricity	.003413 MMBTU/KWH	1.0

The 1979 price per million Btu's is calculated as follows:

$$BYFP = UP / (BTUCF * BTUFE)$$

where:

UP = unit fuel price

The 1979 dollars per million Btu fuel price is converted into an annualized cost much in the same way that a new home price is converted into equal mortgage payments. The annualized fuel price is calculated as follows:

$$\left[\sum_{t=1}^T CYFP_t * \left(\frac{1}{1+DR+AIR} \right)^t \right] * CRF$$

where:

CYFP = current year fuel price in the t^{th} year
 = $BYFP * (1. + AIR + FESCR)^t$
 DR = discount rate
 AIR = annual inflation rate
 CRF = capital recovery factor
 FESCR = annual fuel escalation rate
 BYFP = base year fuel price
 T = length of ownership period

The last type of information needed is solar add-on cost. The cost estimates are given as a dollar per square foot of collector area cost. It is assumed that these passive designs have no fixed costs. These costs aren't needed for the cost goal calculation since a maximum value for this parameter is what is being calculated. For the target escalation rate calculation the variable cost estimates shown in Table I were used.

The maximum cost goal calculation is based on the idea that a system can be defined as feasible when the add-on cost is just equal to the cost of supplying the displaced conventional fuel over the ownership of the system. The annualized fuel cost is used in conjunction with the amount of conventional fuel displaced to calculate this cost. The application of a fixed charge rate assures that the result is in current dollar terms. The total cost figure is divided by the collector area to yield a dollars per square foot of collector area figure. The maximum allowable variable cost for the j^{th} system, k^{th} solar fraction, assuming the i^{th} auxiliary fuel is calculated as follows:

$$VCG(J,I,K) + \frac{AFP(I) * CFDISP(J,I,K)}{CA(J,I,K) * FCR}$$

where:

VCG = variable cost goal
 AFP = annualized fuel price
 CFDISP = conventional fuel displaced
 FCR = fixed charge rate

TABLE I

DETAILED COST BREAKDOWN: TWO PASSIVE SOLAR DESIGNS*
 (\$/sq. ft. collector area)

Trombe Wall	Cost**	Direct Gain	Cost**
Masonry Concrete - 18"	\$ 6.53	Concrete Block - 8"	\$ 3.22
Paint - 2 Sides	.44	Concrete Slab - 2" Additional	1.54
Double Glazing 2-3/16"	3.54	Double Glazing 2-3/16"	3.54
Footing 16" Foundation	1.16	Header Trim (Overhang)	1.36
Header Trim (Overhang)	1.36	Framing 4'X8' - 24ft _L	2.86
Framing 4'X8' - 24 ft _L	2.86	Night Insulation	4.35
Night Insulation	4.35	System Subtotal	\$16.87
System Subtotal	\$20.24	Interior Wall Credit	1.10
Exterior Wall Credit	2.27	Exterior Wall Credit	2.27
Total System	\$17.97	Total System	\$13.50

* Dollar cost are for national average.

** Includes both materials and labor.

The minimum allowable fuel escalation rate is defined as the annual fuel escalation rate which will guarantee that the value of the conventional fuel being displaced will, over the ownership period in question, be equal to the specified solar add-on cost. The determination of this required escalation rate is made in a computerized iterative procedure since no analytical solution exists. The 'starting point' escalation rates are noted in Table II. This real escalation rate is added to the annual inflation rate (resulting in a nominal rate) and this figure is used to calculate the annualized fuel cost over the ownership period as previously described. A variable solar add-on cost is then calculated (in the previously described manner) using this annualized fuel price. The calculated cost is then compared with the specified cost. If the two costs deviate to any great degree the escalation rate is increased (decreased) as necessary and the procedure gone through again. This continues until the calculated cost matches the estimated cost. The escalation rate producing this result is, by definition, the minimum nominal rate required to guarantee feasibility over the specified ownership period.

Three ownership periods were examined; 7, 15, and 30 years. The 7 year period closely approximates the average home ownership period in the United States. The 30 year period corresponds to the average length of a home mortgage. The use of multiple ownership periods shows the sensitivity of feasibility results to consumer payback preferences. If a homeowner requires that the system pay for itself on a life cycle cost basis during his occupancy of the home

(i.e., 7 years) rather than over the mortgage life of the home, (i.e., 30 years) he will be faced with a much lower solar add-on cost requirement. This can also easily be translated into a requirement for very high conventional fuel prices (escalation rates).

4. RESULTS

Selected mapped results are shown throughout this section of the paper. The map results are given on a state-by-state basis; one city was chosen to represent the state as a whole. Tabular results are presented in Table III for all 223 locations. The tables include results for the two passive solar designs, two alternative fuel types and three ownership periods; the mapped results are selected from the full tabular results.

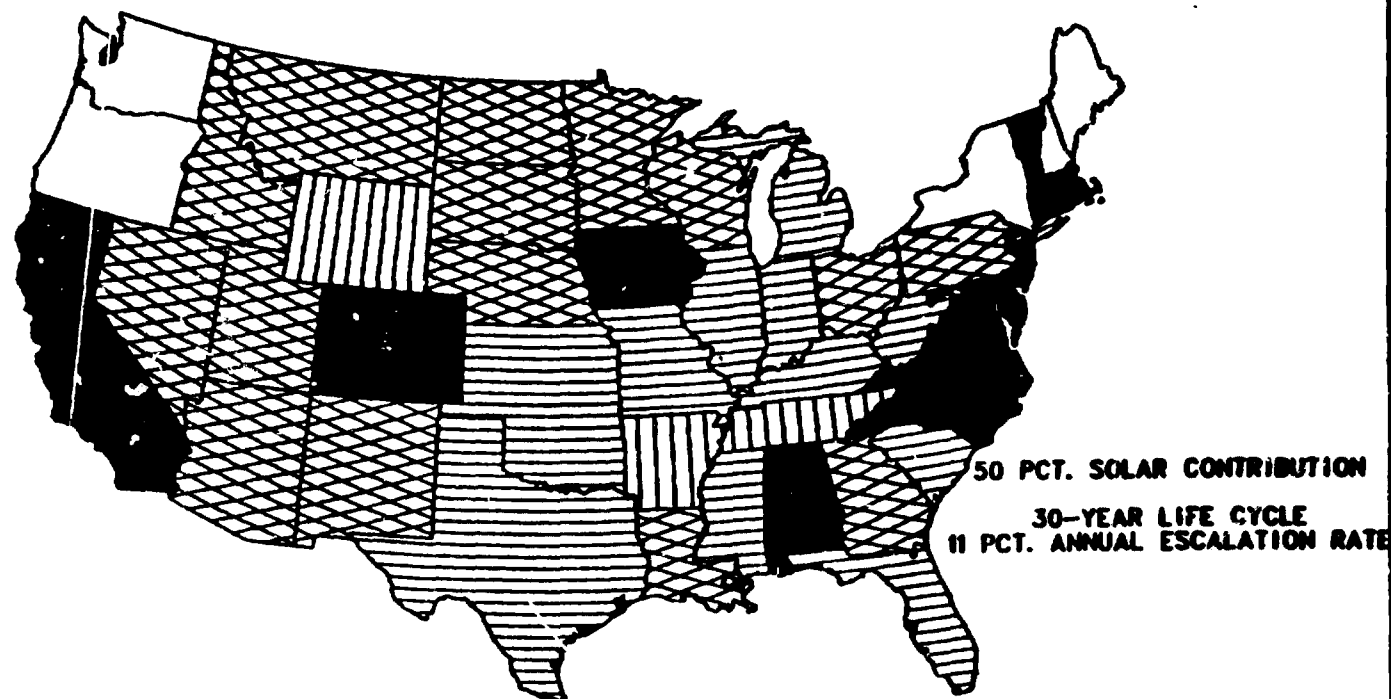
Footnotes following Table III explain the meaning of all of the abbreviations used. The results for the three ownership periods are divided into two fuel types within each period. The first line of the table contains the state and city name. Cities chosen to represent the state as a whole are marked with an asterick. The two numbers at the end of the first line show the base year prices for gas and electricity (units: \$/MCF, ¢/KWH respectively). The next four lines can be subdivided into two sets of two lines each -- one set for the Trombe wall system (TWN1), one for the direct gain system (DGN1), both systems are for 50% solar contribution. The CG row shows cost goal results for both fuels and all three ownership period. The ER row shows necessary escalation rates for the same configuration. The cost goal results are in \$/sq. ft. of collector area terms. The escalation rate results are in nominal percentage annual increase.

Maximum allowable solar costs for a 50% solar contribution are shown in Maps 3 and 4. Map 3 displays results assuming natural gas as the alternative fuel, Map 4 assumes electricity as the alternative fuel. Natural gas is an extremely cheap alternative fuel at the present time. Using 11% as a nominal annual escalation rate and the longest ownership period, the maximum allowable add-on cost is below \$13.50 per square foot of collector area in all states. The cost goal is highest in the extreme northeastern and northwestern portions of the country; these areas also have the highest natural gas prices. Even in these areas the cost goal falls short of the estimated variable cost for the direct gain system (\$13.50). Map 4 shows the same results against electric resistance. In general the cost goals are much higher, reflecting the higher cost of electricity. The pattern is basically the same; areas of extremely high alternative fuel costs or moderately high fuel costs coupled with very high heating loads are those areas which tolerate the highest solar add-on costs. New York and New Mexico are examples of the first case while South Dakota is an example of the second.

The tabular results show the same pattern. The cost goal figure is modified by the hypothesized ownership period which is directly related to the allowable add-on cost. As the period within which feasibility is defined is shortened, the maximum allowable add-on cost decreases. The results for the 7 year ownership period show very low solar costs would be necessary to result in a competitive situation.

The target escalation rate results are shown for 50% solar contribution by a direct gain passive solar design (R-9 night insulation) assuming a variable cost of \$13.50. Maps 5 through 8 show results for two alternative fuels -- gas and electricity -- and two ownership periods -- 7 and 30 years. The maps show ranges of percent annual nominal escalation rates necessary to achieve competitiveness given the cost of the system. Maps 5 and 6 display necessary rates

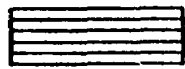
MAXIMUM ALLOWABLE SOLAR COST DIRECT GAIN WITH NIGHT INSULATION ALTERNATIVE FUEL--NATURAL GAS



DOLLARS PER SQUARE FOOT OF COLLECTOR



0.00-3.00



3.01-4.50



4.51-6.00



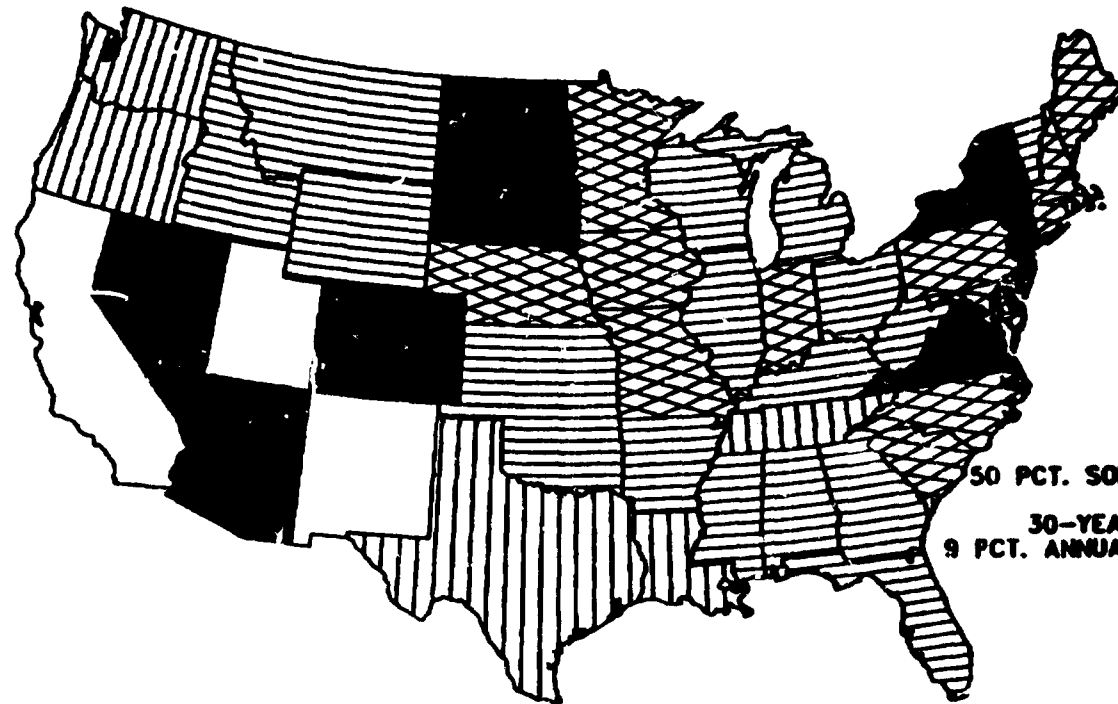
6.01-8.30



7.51+

MAP 4

MAXIMUM ALLOWABLE SOLAR COST
DIRECT GAIN WITH NIGHT INSULATION
ALTERNATIVE FUEL--ELECTRICITY

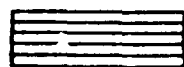


50 PCT. SOLAR CONTRIBUTION
30-YEAR LIFE CYCLE
9 PCT. ANNUAL ESCALATION RATE

DOLLARS PER SQUARE FOOT OF COLLECTOR



0.-10.00



10.01-13.50



13.51-17.00



17.01-21.50

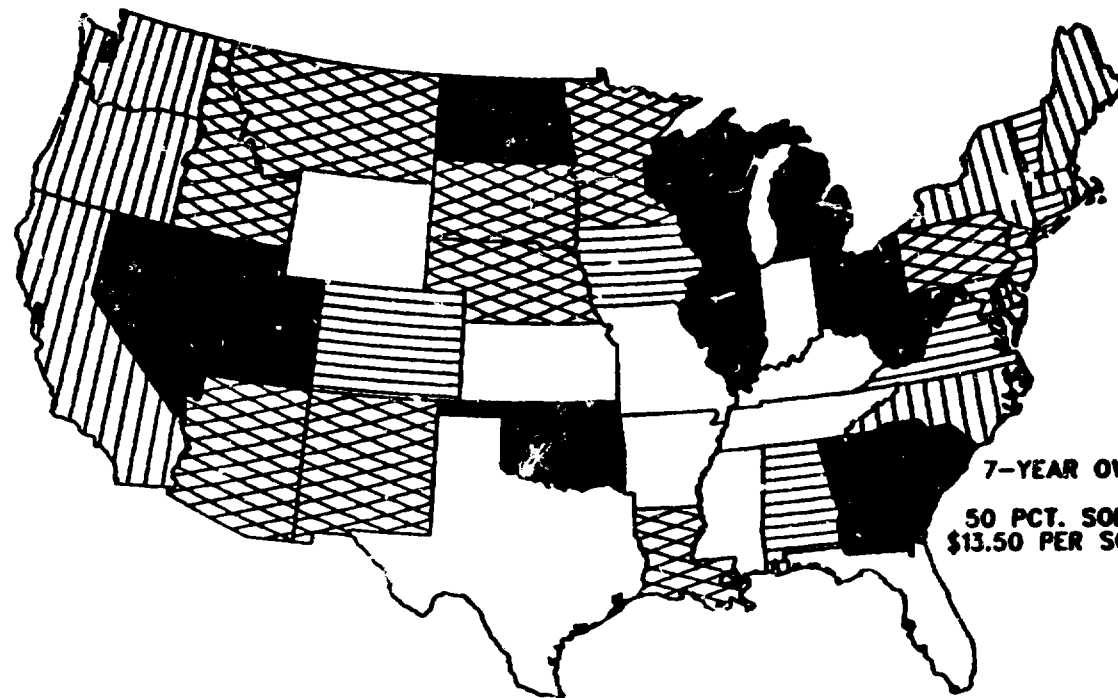


21.51+



MAP 5

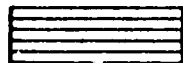
MINIMUM ALLOWABLE ESCALATION RATES
DIRECT GAIN WITH NIGHT INSULATION
ALTERNATIVE FUEL--NATURAL GAS



PERCENT ANNUAL NOMINAL RATE OF INCREASE



<62



62-64



65-70



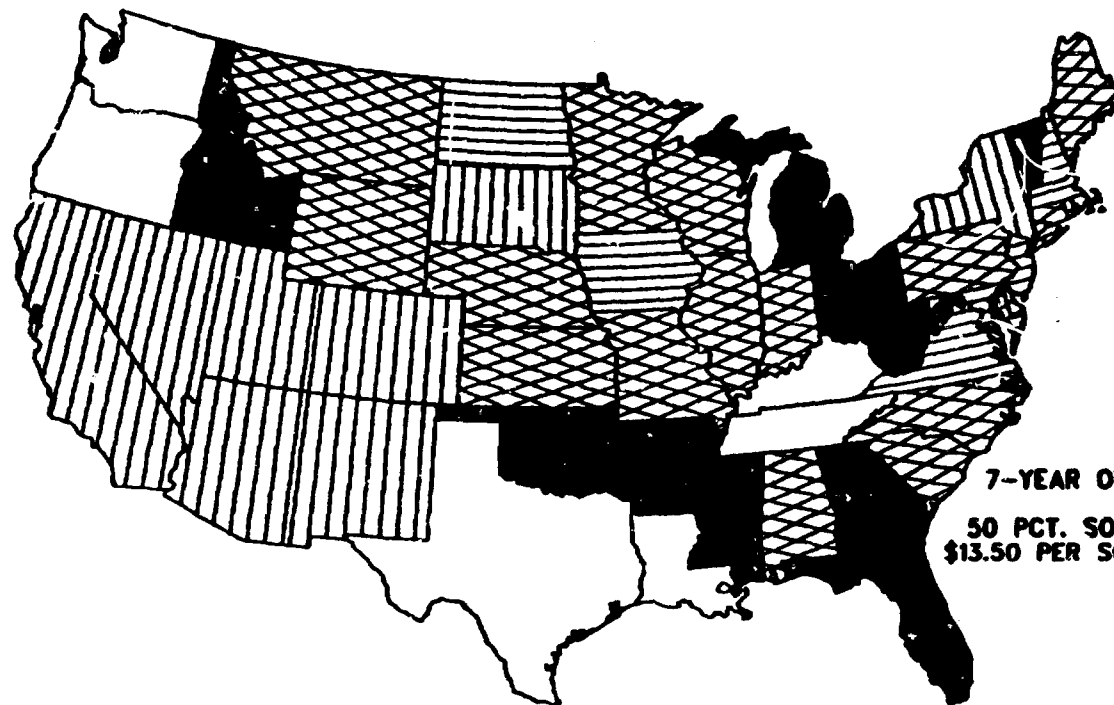
71-75



76+



MINIMUM ALLOWABLE ESCALATION RATES DIRECT GAIN WITH NIGHT INSULATION ALTERNATIVE FUEL--ELECTRICITY

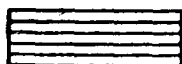


7-YEAR OWNERSHIP PERIOD
50 PCT. SOLAR CONTRIBUTION
\$13.50 PER SQ. FT OF COLLECTOR

PERCENT ANNUAL NOMINAL RATE OF INCREASE



<26



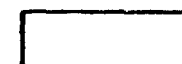
26-31



32-37



38-41



42+

given a 7 year ownership period. It can be seen that the cheaper base year fuel requires very high annual escalation rates while the more expensive fuel, electricity, requires less dramatic rates. Both fuels require rates which are extremely high as a result of the shortened ownership period. A state-by-state comparison of these results leads to the general conclusion that locations with the highest initial fuel costs are those which require the lowest escalation rates.

This pattern of results is, in general, reported in Maps 7 and 8. The increased period of ownership (30 years) results in a dramatic lowering of the necessary escalation rates. The state-by-state pattern is preserved. The necessary rates for natural gas are somewhat in excess of those hypothesized by most while, in those locations with the highest base year electricity prices, a deflation of the real cost of the fuel over time would result in system feasibility. The necessary rates in locations such as Reno and Albuquerque are less than the 7% annual inflation rate incorporated into the basic model assumptions; this implies a real decrease in the price of electricity.

5. CONCLUSIONS

The target cost methodology is useful in assessing the sensitivity of the competitiveness of passive solar designs to the solar add-on cost and fuel cost parameters. This technique allows for the estimation of parameter values when the establishment of these values can only be made with some uncertainty. The analysis presented here leads to the following conclusions.

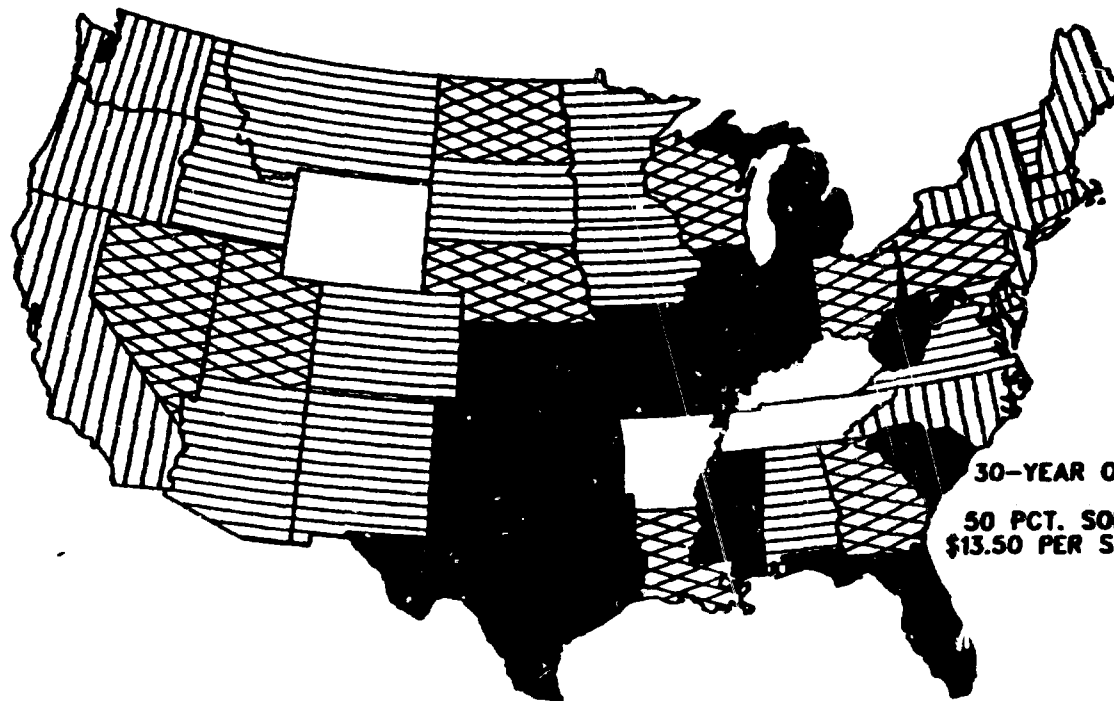
- Natural gas prices are, with some exceptions, so low that neither of the passive designs analyzed here can favorably compete.
- Escalation rates necessary to define competitiveness under a natural gas alternative are in general, very high given a 30 year ownership period and increase dramatically with a decrease in ownership period.
- Base year prices for electric resistance are sufficiently high in several southwestern and northeastern locations to suggest that both the direct gain and Trombe wall systems can compete today under longer ownership periods.
- While necessary escalation rates are rather high under a 7 year ownership period, de-escalation could be experienced in several locations for the 30 year ownership period.
- The Trombe wall and direct gain systems perform in very similar manners in nearly all locations.

6. REFERENCES

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MAP 7

MINIMUM ALLOWABLE ESCALATION RATES
DIRECT GAIN WITH NIGHT INSULATION
ALTERNATIVE FUEL--NATURAL GAS



30-YEAR OWNERSHIP PERIOD
50 PCT. SOLAR CONTRIBUTION
\$13.50 PER SQ.FT. OF COLLECTOR

PERCENT ANNUAL NOMINAL RATE OF INCREASE



<16



16



17



18

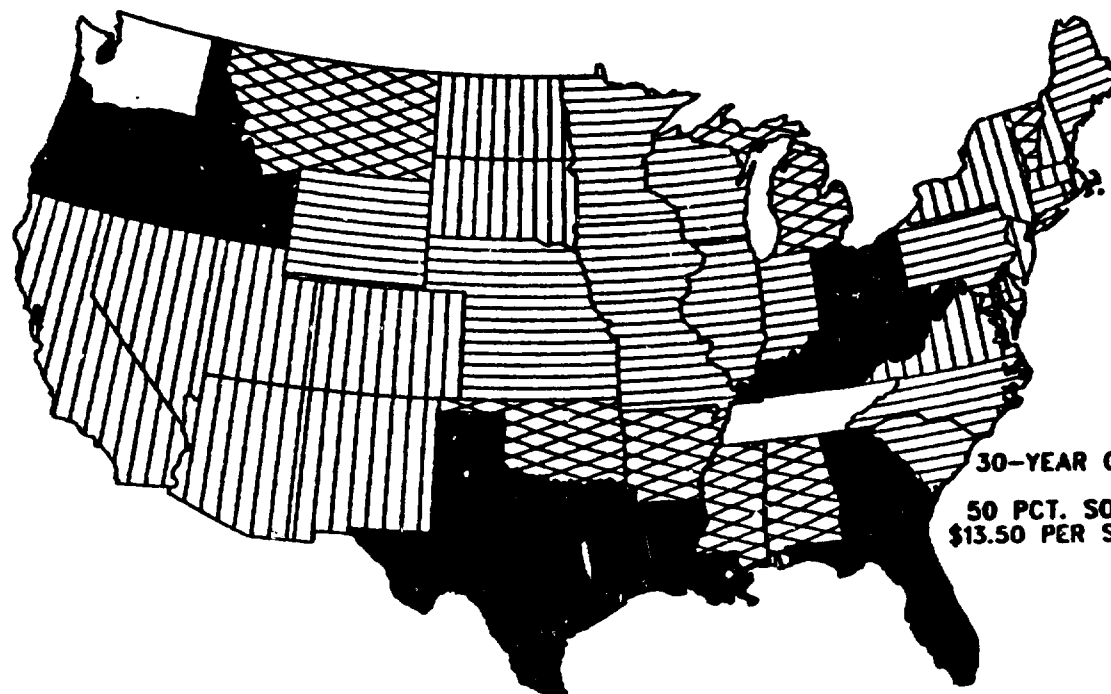


19+



MAP 8

MINIMUM ALLOWABLE ESCALATION RATES
DIRECT GAIN WITH NIGHT INSULATION
ALTERNATIVE FUEL--ELECTRICITY

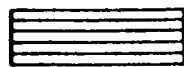


30-YEAR OWNERSHIP PERIOD
50 PCT. SOLAR CONTRIBUTION
\$13.50 PER SQ.FT. OF COLLECTOR

PERCENT ANNUAL NOMINAL RATE OF INCREASE



9<



9



10



11



12+



An: Annual Meeting of AS/ISES, Denver, Colorado, (Aug. 23-31, 1978).

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7. ACKNOWLEDGEMENTS

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TABLE II
FINANCIAL PARAMETERS

Annual Inflation Rate	7%		
Annual Escalation Rates:	Gas	4%	
	Elec.	2%	
Interest Rate (Real)	3.5%		
Discount Rate (Real)	3.5%		
		Ownership Period	
		7	15 30
Capital Recovery Factors:		.18	.11 .08
Fixed Charge Rates:		.16	.09 .05

TABLE III. COST GOALS AND TARGET FUEL ESCALATION RATES
(units: \$/ft² collector area; annual nominal percent increase)

		OWNERSHIP PERIOD						OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC
*CT	HARTFORD												
	TWNI CG	2.13	5.68	4.31	10.68	3.72	4.89						
	ER	0.69	0.39	0.28	0.16	0.17	0.10						
	DGNI CG	2.04	5.44	4.13	10.23	6.66	14.30						
	ER	0.67	0.37	0.27	0.15	0.16	0.09						
ME	BANGOR												
	TWNI CG	3.07	7.07	6.23	13.29	4.12	4.67						
	ER	0.58	0.33	0.24	0.13	0.15	0.09						
	DGNI CG	2.93	6.76	5.95	12.71	9.60	17.77						
	ER	0.56	0.32	0.23	0.12	0.14	0.08						
ME	CARIBOU												
	TWNI CG	3.11	9.00	6.32	16.92	4.12	5.86						
	ER	0.58	0.27	0.24	0.10	0.14	0.08						
	DGNI CG	2.81	8.12	5.70	15.76	9.19	21.34						
	ER	0.58	0.27	0.23	0.10	0.14	0.07						
*ME	PORTLAND												
	TWNI CG	2.78	6.12	5.64	11.50	4.12	4.46						
	ER	0.61	0.37	0.25	0.15	0.15	0.10						
	DGNI CG	2.54	5.60	5.16	10.52	8.32	14.70						
	ER	0.60	0.37	0.24	0.14	0.15	0.09						
*MA	BOSTON												
	TWNI CG	2.14	6.16	4.34	11.57	3.61	5.11						
	ER	0.68	0.37	0.28	0.15	0.17	0.10						
	DGNI CG	2.06	5.94	4.18	11.15	6.75	15.60						
	ER	0.67	0.35	0.27	0.13	0.16	0.09						
*NH	CONCORD												
	TWNI CG	3.04	7.04	6.18	13.23	4.80	5.46						
	ER	0.58	0.33	0.24	0.13	0.15	0.09						
	DGNI CG	2.77	6.41	5.63	12.05	9.07	16.85						
	ER	0.58	0.33	0.23	0.13	0.14	0.08						
NJ	LAKEHURST												
	TWNI CG	1.59	5.77	3.24	10.85	2.73	4.86						
	ER	0.77	0.39	0.31	0.15	0.18	0.10						
	DGNI CG	1.59	5.77	3.24	10.85	5.22	15.16						
	ER	0.74	0.36	0.30	0.14	0.17	0.09						
*NJ	NEWARK												
	TWNI CG	1.97	7.10	3.99	13.33	3.45	6.12						
	ER	0.71	0.33	0.29	0.13	0.17	0.09						
	DGNI CG	1.97	7.10	3.99	13.33	6.44	18.64						
	ER	0.68	0.30	0.27	0.11	0.16	0.08						
NY	ALBANY												
	TWNI CG	1.95	5.07	3.95	9.53	3.28	4.20						
	ER	0.71	0.42	0.29	0.17	0.17	0.11						
	DGNI CG	1.77	4.61	3.60	8.67	5.80	12.13						
	ER	0.71	0.42	0.29	0.17	0.17	0.11						
NY	BINGHAMTON												
	TWNI CG	1.37	5.31	2.78	9.99	2.52	4.81						
	ER	0.82	0.41	0.33	0.16	0.19	0.11						
	DGNI CG	1.23	4.77	2.49	8.96	4.07	12.52						
	ER	0.82	0.41	0.33	0.16	0.19	0.10						
NY	BUFFALO												
	TWNI CG	1.17	4.64	2.37	8.72	2.15	4.20						
	ER	0.87	0.45	0.35	0.18	0.20	0.12						
	DGNI CG	1.05	4.18	2.14	7.86	3.45	11.00						
	ER	0.87	0.45	0.34	0.18	0.19	0.11						
NY	MASSENA												
	TWNI CG	2.07	5.25	4.20	9.86	3.37	4.20						
	ER	0.69	0.41	0.28	0.17	0.17	0.11						
	DGNI CG	1.86	4.70	3.77	8.84	6.07	12.36						
	ER	0.69	0.41	0.28	0.16	0.16	0.10						
*NY	NEW YORK												
	TWNI CG	2.59	8.34	5.26	15.67	4.89	7.74						
	ER	0.63	0.29	0.26	0.11	0.16	0.09						
	DGNI CG	2.50	8.05	5.08	15.13	8.19	21.15						
	ER	0.61	0.27	0.25	0.10	0.15	0.07						
NY	ROCHESTER												
	TWNI CG	1.69	4.84	3.44	9.09	3.21	4.51						
	ER	0.75	0.43	0.30	0.18	0.18	0.11						
	DGNI CG	1.53	4.36	3.10	8.20	5.00	11.46						
	ER	0.75	0.43	0.30	0.17	0.17	0.11						
NY	SYRACUSE												
	TWNI CG	1.72	4.47	3.49	8.41	3.28	4.20						
	ER	0.75	0.46	0.30	0.18	0.18	0.12						
	DGNI CG	1.55	4.03	3.14	7.58	5.07	10.60						
	ER	0.75	0.46	0.30	0.18	0.17	0.11						
PA	ALLENTOWN												
	TWNI CG	1.90	5.64	3.85	10.60	3.20	4.68						
	ER	0.72	0.39	0.29	0.16	0.17	0.10						
	DGNI CG	1.82	5.42	3.70	10.19	5.97	14.25						
	ER	0.70	0.38	0.28	0.15	0.17	0.10						

* location used in Maps 1 - 8

TWNI - Trombe Wall with R-9 night insulation

DGNI - Direct gain with R-9 night insulation

CG - Cost goals or targets

ER - Target escalation rate

Table III (continued)

		OWNERSHIP PERIOD						OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC
PN	AVOCA												
	TWNI CG	1.89	5.38	3.83	10.11	3.34	4.68						
	ER	0.72	0.41	0.29	0.16	0.17	0.11						
	DGNI CG	1.81	5.15	3.67	9.68	5.92	13.53						
	ER	0.70	0.39	0.28	0.15	0.17	0.10						
PN	ERIE												
	TWNI CG	1.31	5.23	2.65	9.84	2.43	4.79						
	ER	0.83	0.41	0.33	0.17	0.19	0.11						
	DGNI CG	1.18	4.72	2.37	8.87	3.86	12.41						
	ER	0.83	0.41	0.33	0.16	0.19	0.10						
PN	HARRISBURG												
	TWNI CG	1.76	5.25	3.58	9.86	3.20	4.68						
	ER	0.74	0.41	0.30	0.17	0.18	0.11						
	DGNI CG	1.76	5.25	3.58	9.86	5.77	13.78						
	ER	0.71	0.38	0.29	0.15	0.17	0.10						
PN	PHILADELPHIA												
	TWNI CG	1.89	5.01	3.83	9.41	3.31	4.32						
	ER	0.72	0.43	0.29	0.17	0.17	0.11						
	DGNI CG	1.89	5.01	3.83	9.41	6.17	13.16						
	ER	0.69	0.40	0.28	0.16	0.16	0.10						
*PN	PITTSBURGH												
	TWNI CG	1.69	6.13	3.43	11.52	3.17	5.65						
	ER	0.75	0.37	0.31	0.15	0.18	0.10						
	DGNI CG	1.55	5.61	3.14	10.54	5.06	14.74						
	ER	0.75	0.37	0.30	0.14	0.17	0.09						
*RI	PROVIDENCE												
	TWNI CG	2.28	6.27	4.63	11.77	3.76	5.08						
	ER	0.67	0.37	0.27	0.14	0.17	0.10						
	DGNI CG	2.28	6.27	4.63	11.77	7.46	16.46						
	ER	0.64	0.34	0.26	0.13	0.15	0.09						
*VT	BURLINGTON												
	TWNI CG	2.12	4.85	4.31	9.12	3.61	4.06						
	ER	0.69	0.43	0.28	0.17	0.17	0.11						
	DGNI CG	1.90	4.35	3.86	8.18	6.23	11.43						
	ER	0.69	0.43	0.28	0.17	0.16	0.11						
*AL	BIRMINGHAM												
	TWNI CG	1.76	4.25	3.56	7.99	3.45	4.11						
	ER	0.74	0.47	0.30	0.19	0.18	0.12						
	DGNI CG	1.87	4.53	3.79	8.51	6.12	11.90						
	ER	0.69	0.42	0.28	0.17	0.16	0.11						
AL	MOBILE												
	TWNI CG	1.26	3.77	2.35	7.09	2.78	4.11						
	ER	0.84	0.50	0.34	0.20	0.20	0.13						
	DGNI CG	1.38	4.15	2.80	7.79	4.52	10.90						
	ER	0.78	0.45	0.31	0.18	0.18	0.11						
AL	MONTGOMERY												
	TWNI CG	1.67	4.06	3.40	7.62	3.45	4.11						
	ER	0.76	0.48	0.31	0.20	0.18	0.12						
	DGNI CG	1.83	4.42	3.71	8.31	5.98	11.62						
	ER	0.70	0.43	0.28	0.17	0.17	0.11						
AR	FORT SMITH												
	TWNI CG	1.02	4.00	2.07	7.51	1.87	3.61						
	ER	0.91	0.49	0.36	0.20	0.21	0.13						
	DGNI CG	1.07	4.20	2.17	7.88	3.50	11.02						
	ER	0.86	0.44	0.34	0.18	0.19	0.11						
*AR	LITTLE ROCK												
	TWNI CG	0.65	4.21	1.33	7.92	1.22	3.87						
	ER	1.05	0.47	0.41	0.19	0.23	0.12						
	DGNI CG	0.68	4.41	1.39	8.29	2.24	11.60						
	ER	1.00	0.43	0.39	0.17	0.22	0.11						
*DL	WILMINGTON												
	TWNI CG	1.91	6.60	3.88	12.40	3.31	5.61						
	ER	0.72	0.35	0.29	0.14	0.17	0.09						
	DGNI CG	1.91	6.60	3.58	12.40	6.26	17.34						
	ER	0.69	0.32	0.28	0.12	0.16	0.08						
DC	WASHINGTON												
	TWNI CG	1.97	4.39	3.99	8.25	3.47	3.81						
	ER	0.71	0.46	0.29	0.19	0.17	0.12						
	DGNI CG	1.97	4.39	3.99	8.25	6.44	11.54						
	ER	0.68	0.43	0.27	0.17	0.16	0.11						
FL	APALACHICOLA												
	TWNI CG	1.63	3.95	3.31	7.43	3.72	4.44						
	ER	0.76	0.49	0.31	0.20	0.18	0.13						
	DGNI CG	1.82	4.43	3.70	8.32	5.97	11.64						
	ER	0.70	0.43	0.28	0.17	0.17	0.11						
FL	DAYTONA BEACH												
	TWNI CG	1.04	3.45	2.12	6.49	2.38	3.87						
	ER	0.90	0.53	0.36	0.21	0.20	0.13						
	DGNI CG	1.19	3.94	2.42	7.41	3.90	10.36						
	ER	0.83	0.46	0.33	0.18	0.19	0.12						

Table III (continued)

		OWNERSHIP PERIOD						OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC
FL	JACKSONVILLE												
	TWNI CG	1.09	4.41	2.21	8.29	2.38	4.75						
	ER	0.89	0.46	0.35	0.19	0.20	0.12						
	DGNI CG	1.22	4.96	2.48	9.31	4.00	13.02						
	FR	0.82	0.40	0.33	0.16	0.19	0.10						
FL	MIAMI												
	TWNI CG	0.87	2.84	1.74	5.33	2.40	3.87						
	ER	0.96	0.58	0.38	0.24	0.21	0.15						
	DGNI CG	0.99	3.25	2.01	6.11	3.24	8.54						
	ER	0.89	0.51	0.35	0.21	0.20	0.13						
*FL	ORLANDO												
	TWNI CG	1.05	3.51	2.13	6.59	2.40	3.95						
	ER	0.90	0.52	0.36	0.21	0.20	0.13						
	DGNI CG	1.20	4.01	2.43	7.54	3.92	10.54						
	ER	0.83	0.46	0.33	0.18	0.19	0.11						
FL	TALLAHASSEE												
	TWNI CG	1.71	3.73	3.48	7.01	3.72	3.98						
	ER	0.75	0.51	0.30	0.21	0.18	0.13						
	DGNI CG	1.91	4.16	3.88	7.82	6.26	10.93						
	ER	0.69	0.45	0.28	0.18	0.16	0.11						
FL	TAMPA												
	TWNI CG	1.22	4.44	2.47	8.34	2.86	5.13						
	ER	0.85	0.46	0.34	0.19	0.20	0.12						
	DGNI CG	1.39	5.07	2.82	9.53	4.55	13.32						
	ER	0.78	0.39	0.31	0.15	0.18	0.10						
FL	WEST PALM BEACH												
	TWNI CG	0.84	2.80	1.70	5.25	2.36	3.87						
	ER	0.97	0.59	0.38	0.24	0.27	0.15						
	DGNI CG	0.98	3.28	2.00	6.17	3.21	8.63						
	ER	0.89	0.51	0.35	0.21	0.20	0.13						
*GA	ATLANTA												
	TWNI CG	1.38	3.83	2.81	7.20	2.67	3.64						
	ER	0.81	0.50	0.33	0.20	0.19	0.13						
	DGNI CG	1.48	4.10	3.00	7.70	4.84	10.77						
	ER	0.76	0.45	0.31	0.18	0.18	0.11						
GA	AUGUSTA												
	TWNI CG	1.37	3.81	2.79	7.16	2.67	3.64						
	ER	0.82	0.50	0.33	0.20	0.19	0.13						
	DGNI CG	1.48	4.10	3.00	7.71	4.84	10.78						
	ER	0.76	0.45	0.31	0.18	0.18	0.11						
GA	MACON												
	TWNI CG	1.30	3.60	2.64	6.77	2.67	3.64						
	ER	0.83	0.51	0.33	0.21	0.25	0.17						
	DGNI CG	1.41	3.92	2.87	7.37	4.63	10.30						
	ER	0.78	0.46	0.31	0.18	0.18	0.12						
GA	SAVANNAH												
	TWNI CG	1.29	4.64	2.62	8.76	2.67	4.73						
	ER	0.83	0.44	0.34	0.18	0.23	0.12						
	DGNI CG	1.41	5.09	2.87	9.57	4.63	13.38						
	ER	0.78	0.39	0.31	0.15	0.18	0.10						
KY	COVINGTON												
	TWNI CG	1.66	3.85	3.38	7.24	3.23	3.68						
	ER	0.76	0.50	0.31	0.20	0.44	0.13						
	DGNI CG	1.66	3.85	3.38	7.24	5.44	10.13						
	ER	0.73	0.47	0.29	0.19	0.17	0.12						
KY	LEXINGTON												
	TWNI CG	1.40	4.20	2.84	7.90	2.61	3.86						
	ER	0.81	0.47	0.33	0.19	0.57	0.12						
	DGNI CG	1.40	4.20	2.84	7.90	4.57	11.05						
	ER	0.78	0.44	0.31	0.18	0.18	0.11						
*KY	LOUISVILLE												
	TWNI CG	1.12	3.87	2.26	7.28	2.12	3.62						
	ER	0.88	0.49	0.35	0.20	3.65	10.18						
	DGNI CG	1.12	3.87	2.26	7.28	0.20	0.13						
	ER	0.85	0.47	0.34	0.19	3.65	10.18						
LA	BATON ROUGE												
	TWNI CG	0.83	2.96	1.48	5.57	1.91	3.36						
	ER	0.97	0.57	0.38	0.23	2.71	7.78						
	DGNI CG	0.91	3.27	1.86	6.15	0.22	0.14						
	ER	0.91	0.51	0.34	0.21	2.99	8.59						
LA	LAKE CHARLES												
	TWNI CG	0.84	2.74	1.70	5.15	2.09	3.36						
	ER	0.97	0.59	0.38	0.24	2.74	7.20						
	DGNI CG	0.92	3.01	1.87	5.67	0.22	0.15						
	ER	0.91	0.54	0.36	0.22	3.02	7.42						
*LA	NEW ORLEANS												
	TWNI CG	1.36	3.38	2.77	6.36	3.08	3.76						
	ER	0.82	0.53	0.33	0.22	4.46	8.89						
	DGNI CG	1.52	3.77	3.08	7.09	0.19	0.14						
	ER	0.75	0.47	0.30	0.19	4.97	9.91						

Table III (continued)

		OWNERSHIP PERIOD					
		GAS	7 YR ELEC	GAS	15 YR ELEC	GAS	30 YR ELEC
LA	SHREVEPORT						
	TWNI CG	0.66	2.73	1.34	5.13	1.38	2.80
	ER	1.05	0.59	0.41	0.24	0.23	0.15
	DGNI CG	0.72	2.97	1.46	5.57	2.35	7.79
*MD	BALTIMORE						
	TWNI CG	1.92	6.13	3.90	11.53	3.36	5.27
	ER	0.72	0.37	0.29	0.15	0.17	0.10
	DGNI CG	1.92	6.13	3.90	11.53	6.29	16.11
MD	PATUXENT RIVER						
	TWNI CG	1.80	5.76	3.66	10.82	5.91	15.12
	ER	0.73	0.39	0.30	0.15	0.18	0.10
	DGNI CG	1.91	6.09	3.87	11.44	6.24	15.99
*MS	JACKSON						
	TWNI CG	1.12	4.09	2.28	7.68	2.33	4.17
	ER	0.88	0.48	0.35	0.20	0.20	0.12
	DGNI CG	1.23	4.47	2.49	8.39	4.02	11.74
MS	MERIDIAN						
	TWNI CG	1.15	4.31	2.33	8.10	2.33	4.31
	ER	0.87	0.47	0.35	0.19	0.20	0.12
	DGNI CG	1.21	4.63	2.50	8.70	4.03	12.17
NC	ASHEVILLE						
	TWNI CG	2.18	5.92	4.43	11.12	3.48	4.64
	ER	0.68	0.36	0.28	0.15	0.17	0.10
	DGNI CG	2.29	6.22	4.66	11.69	7.51	16.35
NC	CAPE HATTERAS						
	TWNI CG	1.85	5.01	3.75	9.42	3.48	4.64
	ER	0.73	0.42	0.30	0.17	0.17	0.11
	DGNI CG	1.99	5.47	4.04	10.15	6.52	14.19
NC	CHARLOTTE						
	TWNI CG	1.80	4.67	3.65	8.77	3.27	4.17
	ER	0.74	0.44	0.30	0.18	0.18	0.12
	DGNI CG	1.92	4.99	3.90	9.37	6.30	13.11

		OWNERSHIP PERIOD					
		GAS	7 YR ELEC	GAS	15 YR ELEC	GAS	30 YR ELEC
NC	CHERRY POINT						
	TWNI CG	1.88	5.09	3.81	9.57	3.48	4.64
	ER	0.72	0.42	0.29	0.17	0.17	0.11
	DGNI CG	2.05	5.57	4.17	10.47	6.72	14.64
NC	GREENSBORO						
	TWNI CG	1.95	5.05	3.95	9.48	3.27	4.17
	ER	0.71	0.42	0.29	0.17	0.17	0.11
	DGNI CG	2.04	5.30	4.15	9.96	6.69	13.93
*NC	RALEIGH						
	TWNI CG	1.95	5.30	3.96	9.95	3.48	4.64
	ER	0.71	0.41	0.29	0.16	0.17	0.11
	DGNI CG	2.05	5.55	4.16	10.43	6.70	14.59
*OK	OKLAHOMA CITY						
	TWNI CG	1.23	4.18	2.50	7.85	2.09	3.48
	ER	0.85	0.47	0.34	0.19	0.20	0.12
	DGNI CG	1.32	4.47	2.68	8.41	4.32	11.74
OK	TULSA						
	TWNI CG	1.17	4.71	2.37	8.86	2.09	4.15
	ER	0.67	0.44	0.35	0.18	0.20	0.11
	DGNI CG	1.23	4.95	2.49	9.31	4.02	13.02
*SC	CHARLESTON						
	TWNI CG	1.18	4.86	2.35	9.13	2.43	4.94
	ER	0.86	0.43	0.35	0.17	0.20	0.11
	DGNI CG	1.27	5.27	2.58	9.89	4.17	13.83
SC	COLUMBIA						
	TWNI CG	1.28	5.27	2.58	9.91	2.43	4.94
	ER	0.84	0.41	0.34	0.16	0.19	0.11
	DGNI CG	1.37	5.68	2.79	10.67	4.50	14.92
SC	GREENVILLE						
	TWNI CG	1.81	4.94	3.64	9.28	3.28	4.39
	ER	0.73	0.43	0.30	0.17	0.18	0.11
	DGNI CG	1.89	5.15	3.84	9.69	4.70	13.54

Table 111 (continued)

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
SC	GREEN						
	TWNI CG	2.02	4.35	4.11	8.18	3.66	3.87
	ER	0.70	0.46	0.28	0.19	0.17	0.12
	DGNI CG	2.11	4.54	4.29	8.54	6.92	11.94
	ER	0.66	0.42	0.27	0.17	0.16	0.11
TN	CHATTANOOGA						
	TWNI CG	0.91	3.22	1.86	6.04	1.81	3.13
	ER	0.54	0.55	0.37	0.22	0.21	0.14
	DGNI CG	0.94	3.30	1.90	6.20	3.07	8.67
	ER	0.90	0.51	0.36	0.21	0.20	0.13
TN	KNOXVILLE						
	TWNI CG	1.15	3.28	2.33	6.16	2.23	3.13
	ER	0.87	0.54	0.35	0.22	0.20	0.14
	DGNI CG	1.18	3.36	2.39	6.31	3.85	8.83
	ER	0.83	0.51	0.33	0.20	0.19	0.13
TN	MEMPHIS						
	TWNI CG	0.77	3.10	1.57	5.82	1.50	2.96
	ER	1.00	0.56	0.39	0.23	0.22	0.14
	DGNI CG	0.81	3.25	1.64	6.11	2.65	8.54
	ER	0.95	0.51	0.37	0.21	0.21	0.13
*TN	NASHVILLE						
	TWNI CG	0.84	2.78	1.71	5.22	1.72	2.79
	ER	0.97	0.59	0.38	0.24	0.22	0.15
	DGNI CG	0.87	2.86	1.76	5.38	2.84	7.52
	ER	0.93	0.55	0.36	0.22	0.20	0.14
TX	ABILENE						
	TWNI CG	1.46	5.07	2.96	9.53	2.93	4.32
	ER	0.80	0.42	0.32	0.17	0.19	0.11
	DGNI CG	1.59	5.52	3.23	10.38	5.21	14.52
	ER	0.74	0.37	0.30	0.14	0.17	0.09
TX	AMARILLO						
	TWNI CG	0.84	7.88	1.71	14.80	1.13	5.18
	ER	0.97	0.30	0.38	0.12	0.22	0.09
	DGNI CG	0.90	8.38	1.82	15.75	2.94	22.03
	ER	0.92	0.26	0.36	0.09	0.20	0.06
TX	AUSTIN						
	TWNI CG	1.70	3.47	3.45	6.53	3.71	3.73
	ER	0.75	0.53	0.30	0.21	0.18	0.13
	DGNI CG	1.90	3.88	3.85	7.28	6.21	10.19
	ER	0.69	0.47	0.28	0.19	0.16	0.12

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
TX	BROWNSVILLE						
	TWNI CG	0.89	3.48	1.81	6.53	2.68	5.14
	ER	0.95	0.52	0.38	0.21	0.21	0.13
	DGNI CG	1.01	3.95	2.05	7.41	3.31	10.37
	ER	0.88	0.46	0.35	0.18	0.20	0.12
TX	CORPUS CHRISTI						
	TWNI CG	1.16	3.59	2.35	6.75	3.09	4.72
	ER	0.87	0.52	0.35	0.21	0.20	0.13
	DGNI CG	1.30	4.05	2.64	7.60	4.26	10.63
	ER	0.80	0.45	0.32	0.18	0.18	0.11
*TX	DALLAS						
	TWNI CG	1.25	3.97	2.54	7.46	2.51	3.92
	ER	0.85	0.49	0.34	0.20	0.20	0.13
	DGNI CG	1.17	3.72	2.37	6.98	3.83	9.70
	ER	0.83	0.48	0.33	0.19	0.19	0.12
TX	DEL RIO						
	TWNI CG	1.32	4.42	2.68	8.30	2.87	4.72
	ER	0.83	0.46	0.33	0.19	0.19	0.12
	DGNI CG	1.48	4.94	2.99	9.27	4.83	12.97
	ER	0.76	0.40	0.31	0.16	0.18	0.10
TX	EL PASO						
	TWNI CG	1.94	6.12	3.94	11.51	2.92	4.53
	ER	0.71	0.37	0.29	0.15	0.17	0.10
	DGNI CG	2.16	6.81	4.38	12.79	7.06	17.89
	ER	0.65	0.32	0.26	0.12	0.16	0.08
TX	FORT WORTH						
	TWNI CG	1.29	3.77	2.62	7.09	2.58	3.71
	ER	0.84	0.50	0.34	0.20	0.19	0.13
	DGNI CG	1.38	4.04	2.81	7.60	4.52	10.82
	ER	0.78	0.45	0.31	0.18	0.18	0.11
TX	HOUSTON						
	TWNI CG	1.26	3.48	2.55	6.55	3.18	4.33
	ER	0.84	0.52	0.34	0.21	0.19	0.13
	DGNI CG	1.38	3.82	2.80	7.17	4.51	10.02
	ER	0.78	0.47	0.31	0.19	0.18	0.12
TX	KINGSVILLE						
	TWNI CG	1.13	3.42	2.30	6.43	3.18	4.72
	ER	0.88	0.53	0.35	0.22	0.20	0.13
	DGNI CG	1.26	3.79	2.55	7.13	4.11	9.94
	ER	0.81	0.47	0.32	0.19	0.19	0.12

Table III (continued)

		OWNERSHIP PERIOD						OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC
TX	LAREDO												
	TWNI CG	1.21	3.65	2.45	6.86	3.18	4.72						
	ER	0.86	0.51	0.34	0.21	0.20	0.13						
	DGNI CG	1.37	4.13	2.77	7.75	4.47	10.84						
	ER	0.79	0.45	0.31	0.18	0.18	0.11						
TX	LUBBOCK												
	TWNI CG	1.76	6.21	3.58	11.67	5.77	16.32						
	ER	0.74	0.37	0.30	0.14	0.18	0.10						
	DGNI CG	1.90	6.68	3.85	12.54	6.20	17.54						
	ER	0.69	0.32	0.28	0.12	0.16	0.08						
TX	LUFKIN												
	TWNI CG	1.48	3.39	3.01	6.36	3.18	3.57						
	ER	0.79	0.53	0.32	0.22	0.19	0.14						
	DGNI CG	1.63	3.72	3.30	6.98	5.33	9.76						
	ER	0.73	0.48	0.29	0.19	0.17	0.12						
TX	MIDLAND												
	TWNI CG	1.58	4.84	3.20	9.10	2.46	3.71						
	ER	0.77	0.43	0.31	0.18	0.18	0.11						
	DGNI CG	1.72	5.29	3.50	9.93	5.64	13.89						
	ER	0.72	0.38	0.29	0.15	0.17	0.10						
TX	PORT ARTHUR												
	TWNI CG	1.40	3.41	2.84	6.40	3.30	3.95						
	ER	0.81	0.53	0.33	0.22	0.19	0.13						
	DGNI CG	1.56	3.79	3.16	7.12	5.09	9.95						
	ER	0.75	0.47	0.30	0.19	0.17	0.12						
TX	SAN ANGELO												
	TWNI CG	1.43	4.82	2.90	9.05	2.61	4.32						
	ER	0.80	0.44	0.32	0.18	0.19	0.11						
	DGNI CG	1.59	5.35	3.23	10.06	5.20	14.06						
	ER	0.74	0.38	0.30	0.15	0.17	0.10						
TX	SAN ANTONIO												
	TWNI CG	1.19	4.06	2.43	7.63	2.65	4.43						
	ER	0.86	0.48	0.34	0.20	0.20	0.12						
	DGNI CG	1.32	4.49	2.68	8.45	4.33	11.81						
	ER	0.80	0.43	0.32	0.17	0.18	0.11						
TX	SHERMAN												
	TWNI CG	0.89	3.80	1.81	7.14	1.70	3.57						
	ER	0.95	0.50	0.38	0.20	0.21	0.13						
	DGNI CG	0.95	4.04	1.92	7.59	3.10	10.62						
	ER	0.90	0.45	0.36	0.18	0.20	0.11						
TX	WACO												
	TWNI CG	1.21	3.48	2.46	6.54	2.53	3.57						
	ER	0.85	0.52	0.34	0.21	0.20	0.13						
	DGNI CG	1.31	3.77	2.67	7.09	4.30	9.91						
	ER	0.80	0.47	0.32	0.19	0.18	0.12						
TX	WICHITA FALLS												
	TWNI CG	1.43	4.26	2.90	8.00	2.53	3.71						
	ER	0.80	0.47	0.32	0.19	0.19	0.12						
	DGNI CG	1.54	4.59	3.12	8.63	5.04	12.06						
	ER	0.75	0.42	0.30	0.17	0.17	0.11						
*VA	NORFOLK												
	TWNI CG	1.78	6.26	3.62	11.76	3.13	5.40						
	ER	0.74	0.37	0.30	0.14	0.18	0.10						
	DGNI CG	1.87	6.55	3.79	12.31	6.11	17.22						
	ER	0.69	0.33	0.28	0.12	0.16	0.08						
VA	RICHMOND												
	TWNI CG	1.92	6.06	3.90	11.40	3.48	5.40						
	ER	0.72	0.37	0.29	0.15	0.17	0.10						
	DGNI CG	2.03	6.40	4.11	12.02	4.63	16.81						
	ER	0.67	0.33	0.27	0.13	0.16	0.08						
VA	ROANOKE												
	TWNI CG	1.78	5.35	3.62	10.06	2.95	4.36						
	ER	0.74	0.41	0.30	0.16	0.18	0.11						
	DGNI CG	1.83	5.50	3.71	10.34	5.99	14.45						
	ER	0.70	0.37	0.28	0.14	0.17	0.09						
*WV	CHARLESTON												
	TWNI CG	1.36	4.11	2.75	7.73	2.70	4.03						
	ER	0.82	0.48	0.33	0.19	0.19	0.12						
	DGNI CG	1.36	4.11	2.75	7.73	4.44	10.81						
	ER	0.79	0.45	0.32	0.18	0.18	0.11						
WV	HUNTINGTON												
	TWNI CG	1.62	4.44	3.30	8.34	3.00	4.03						
	ER	0.77	0.46	0.31	0.19	0.18	0.12						
	DGNI CG	1.62	4.44	3.30	8.34	5.32	11.66						
	ER	0.73	0.43	0.29	0.17	0.17	0.11						
*IL	CHICAGO												
	TWNI CG	1.34	5.05	2.71	9.48	2.23	4.14						
	ER	0.82	0.42	0.33	0.17	0.19	0.11						
	DGNI CG	1.28	4.84	2.60	9.10	4.20	12.73						
	ER	0.81	0.41	0.32	0.16	0.18	0.10						

Table III (continued)

		OWNERSHIP PERIOD						OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC	GAS	ELEC
IL	MOLINE												
	TWNI CG	2.11	5.65	4.29	10.61	3.38	4.44						
	ER	0.89	0.39	0.28	0.16	0.17	0.10						
	DGNI CG	2.03	5.43	4.12	10.20	6.65	14.22						
	ER	0.67	0.30	0.27	0.15	0.16	0.10						
IL	SPRINGFIELD												
	TWNI CG	1.60	4.19	3.25	7.87	2.64	3.39						
	ER	0.77	0.47	0.31	0.19	0.18	0.12						
	DGNI CG	1.55	4.04	3.14	7.60	5.07	10.63						
	ER	0.75	0.45	0.30	0.18	0.17	0.11						
IN	EVANSVILLE												
	TWNI CG	1.20	4.17	2.43	7.84	2.21	3.78						
	ER	0.86	0.47	0.34	0.19	0.20	0.12						
	DGNI CG	1.20	4.17	2.43	7.84	3.92	10.76						
	ER	0.83	0.45	0.33	0.18	0.19	0.11						
IN	FORT WAYNE												
	TWNI CG	1.45	5.09	2.94	9.57	2.59	4.48						
	ER	0.80	0.42	0.32	0.17	0.19	0.11						
	DGNI CG	1.32	4.66	2.69	8.76	4.34	12.24						
	ER	0.80	0.42	0.32	0.16	0.18	0.11						
*IN	INDIANAPOLIS												
	TWNI CG	1.23	5.91	2.49	11.11	2.25	5.33						
	ER	0.85	0.38	0.34	0.15	0.20	0.10						
	DGNI CG	1.18	5.67	2.39	10.66	3.86	14.91						
	ER	0.83	0.36	0.33	0.14	0.19	0.09						
IN	SOUTH BEND												
	TWNI CG	1.44	5.07	2.93	9.54	2.59	4.48						
	ER	0	0.42	0.32	0.17	0.19	0.11						
	DGNI CG	1.31	4.62	2.67	8.69	4.30	12.15						
	ER	0.80	0.42	0.32	0.17	0.18	0.11						
IA	BURLINGTON												
	TWNI CG	1.66	4.78	3.36	8.98	2.65	3.76						
	ER	0.76	0.44	0.31	0.18	0.18	0.11						
	DGNI CG	1.66	4.78	3.36	8.98	5.42	12.56						
	ER	0.73	0.41	0.29	0.16	0.17	0.10						
*IA	DES MOINES												
	TWNI CG	1.86	6.25	3.77	11.75	2.83	4.69						
	ER	0.73	0.37	0.29	0.14	0.17	0.10						
	DGNI CG	1.86	6.25	3.77	11.75	6.07	16.43						
	ER	0.70	0.34	0.28	0.13	0.16	0.09						
IA	MASON CITY												
	TWNI CG	1.59	7.64	3.24	14.37	2.24	5.28						
	ER	0.77	0.31	0.31	0.12	0.22	0.09						
	DGNI CG	1.53	7.32	3.10	13.75	5.00	18.23						
	ER	0.75	0.30	0.30	0.11	0.17	0.07						
IA	SIOUX CITY												
	TWNI CG	1.37	7.05	2.77	13.24	2.01	5.10						
	ER	0.82	0.33	0.33	0.13	0.19	0.09						
	DGNI CG	1.31	6.78	2.66	12.73	4.30	17.80						
	ER	0.80	0.32	0.32	0.12	0.18	0.08						
KS	DODGE CITY												
	TWNI CG	1.08	7.38	2.20	13.86	1.45	4.86						
	ER	0.89	0.32	0.36	0.12	0.20	0.09						
	DGNI CG	1.11	7.58	2.26	14.24	3.64	19.91						
	ER	0.85	0.29	0.34	0.10	0.19	0.07						
KS	GOODLAND												
	TWNI CG	1.17	9.53	2.37	17.90	1.44	5.78						
	ER	0.87	0.25	0.35	0.09	0.20	0.08						
	DGNI CG	1.20	9.82	2.44	18.45	3.94	25.80						
	ER	0.83	0.22	0.33	0.07	0.19	0.05						
KS	TOPEKA												
	TWNI CG	1.03	5.60	2.08	10.52	1.57	4.21						
	ER	0.91	0.40	0.36	0.16	0.21	0.10						
	DGNI CG	1.03	5.60	2.08	10.52	3.36	14.71						
	ER	0.87	0.37	0.35	0.14	0.20	0.09						
*KS	WICHITA												
	TWNI CG	1.20	4.71	2.43	8.85	1.77	3.43						
	ER	0.86	0.44	0.34	0.18	0.20	0.11						
	DGNI CG	1.23	4.83	2.49	9.09	4.02	12.70						
	ER	0.82	0.41	0.33	0.16	0.19	0.10						
MI	ALPENA												
	TWNI CG	1.69	5.64	3.43	10.60	2.53	4.15						
	ER	0.75	0.39	0.31	0.16	0.18	0.10						
	DGNI CG	1.52	5.08	3.09	9.55	4.99	13.36						
	ER	0.75	0.39	0.30	0.15	0.18	0.10						
*MI	DETROIT												
	TWNI CG	1.42	4.86	2.88	9.13	2.53	4.26						
	ER	0.81	0.43	0.32	0.17	0.19	0.11						
	DGNI CG	1.30	4.44	2.63	8.35	4.25	11.68						
	ER	0.80	0.43	0.32	0.17	0.18	0.11						

Table III (continued)

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
MI	FLINT						
	TWNI CG	1.45	5.08	2.94	9.55	2.50	4.31
	ER	0.80	0.42	0.32	0.17	0.19	0.11
	DGNI CG	1.31	4.60	2.66	8.65	4.30	12.10
MI	GRAND RAPIDS						
	TWNI CG	1.42	4.91	2.88	9.23	2.53	4.31
	ER	0.81	0.43	0.32	0.17	0.19	0.11
	DGNI CG	1.28	4.45	2.60	8.36	4.20	11.68
MI	HOUGHTON						
	TWNI CG	1.00	5.99	2.02	11.26	1.76	5.20
	ER	0.92	0.38	0.36	0.15	0.21	0.10
	DGNI CG	0.82	4.95	1.67	9.31	2.70	13.02
MI	SALT STE MARIE						
	TWNI CG	1.73	4.00	3.52	7.52	2.53	2.87
	ER	0.75	0.49	0.30	0.20	0.18	0.13
	DGNI CG	1.47	3.38	2.98	6.36	4.80	8.89
MI	TRAVERSE CITY						
	TWNI CG	1.53	5.50	3.10	10.34	2.53	4.48
	ER	0.78	0.40	0.32	0.16	0.18	0.10
	DGNI CG	1.30	4.69	2.64	8.82	4.26	12.33
MN	DULUTH						
	TWNI CG	2.12	7.93	4.30	14.90	2.91	5.36
	ER	0.69	0.30	0.28	0.11	0.17	0.09
	DGNI CG	1.90	7.11	3.85	13.36	6.21	18.68
MN	INTERNATIONAL FALLS						
	TWNI CG	1.76	4.55	3.57	8.55	2.36	3.00
	ER	0.74	0.45	0.30	0.18	0.18	0.12
	DGNI CG	1.47	3.81	2.99	7.15	4.82	10.00
*MN	MINNEAPOLIS						
	TWNI CG	1.82	6.25	3.70	11.74	2.71	4.57
	ER	0.73	0.37	0.30	0.14	0.18	0.10
	DGNI CG	1.65	5.66	3.35	10.63	5.40	14.87

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
MN	ROCHESTER						
	TWNI CG	1.48	5.23	3.00	9.83	2.18	3.80
	ER	0.79	0.41	0.32	0.17	0.19	0.11
	DGNI CG	1.34	4.75	2.72	8.92	4.38	12.47
MO	COLUMBIA						
	TWNI CG	1.22	5.73	2.47	10.78	2.05	4.74
	ER	0.85	0.39	0.34	0.15	0.20	0.10
	DGNI CG	1.22	5.73	2.47	10.78	3.99	15.07
*MO	KANSAS CITY						
	TWNI CG	1.16	5.33	2.36	10.02	1.85	4.18
	ER	0.87	0.41	0.35	0.16	0.20	0.11
	DGNI CG	1.16	5.33	2.36	10.02	3.80	14.02
MO	SPRINGFIELD						
	TWNI CG	1.11	5.63	2.26	10.57	1.54	4.57
	ER	0.86	0.39	0.35	0.16	0.20	0.10
	DGNI CG	1.15	5.80	2.33	10.89	3.76	15.23
MO	ST LOUIS						
	TWNI CG	1.92	5.05	3.88	9.48	3.24	4.19
	ER	0.72	0.42	0.29	0.17	0.17	0.11
	DGNI CG	1.92	5.05	3.88	9.48	6.28	13.26
NB	GRAND ISLAND						
	TWNI CG	1.54	8.18	3.13	15.37	2.12	5.53
	ER	0.78	0.29	0.32	0.11	0.18	0.09
	DGNI CG	1.54	8.18	3.13	15.37	5.05	21.49
*IL	NORTH OMAHA						
	TWNI CG	1.63	5.43	3.30	10.21	2.34	3.84
	ER	0.77	0.40	0.31	0.16	0.18	0.11
	DGNI CG	1.57	5.24	3.18	9.84	5.14	13.76
NR	NORTH PLATTE						
	TWNI CG	1.73	5.77	3.51	10.85	2.12	3.48
	ER	0.75	0.39	0.30	0.15	0.18	0.10
	DGNI CG	1.73	5.77	3.51	10.85	5.66	15.17

Table III (continued)

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
PITTSBURGH							
INT	CG	1.56	6.28	3.18	11.80	5.12	16.50
	ER	0.78	0.36	0.31	0.14	0.18	0.10
INT	CG	1.56	6.28	3.18	11.80	5.12	16.50
	ER	0.75	0.34	0.30	0.13	0.17	0.08
ISARCK							
INT	CG	1.60	7.50	3.24	14.09	5.23	19.70
	ER	0.77	0.32	0.31	0.12	0.18	0.09
INT	CG	1.45	6.03	2.95	12.83	4.76	17.94
	ER	0.77	0.31	0.31	0.12	0.18	0.08
ARGO							
INT	CG	1.89	5.95	3.83	11.18	2.73	4.23
	ER	0.72	0.38	0.29	0.15	0.17	0.10
INT	CG	1.69	5.33	3.43	10.02	5.54	14.01
	ER	0.72	0.38	0.29	0.15	0.17	0.10
INOT							
INT	CG	2.02	6.22	4.09	11.68	6.60	16.34
	ER	0.70	0.37	0.29	0.14	0.17	0.10
INT	CG	1.82	5.60	3.69	10.52	5.94	14.72
	ER	0.70	0.37	0.28	0.14	0.17	0.09
IRON							
INT	CG	1.25	5.55	2.54	10.42	2.33	5.08
	ER	0.85	0.40	0.34	0.16	0.20	0.10
INT	CG	1.19	5.29	2.42	9.95	3.91	13.91
	ER	0.83	0.38	0.33	0.15	0.19	0.10
INCINNATI							
INT	CG	1.38	4.08	2.80	7.68	4.52	10.73
	ER	0.82	0.48	0.33	0.20	0.19	0.12
INT	CG	1.38	4.08	2.80	7.68	4.52	10.73
	ER	0.78	0.45	0.31	0.18	0.18	0.11
LEVFLAND							
INT	CG	1.24	5.70	2.51	10.71	2.33	5.28
	ER	0.85	0.39	0.34	0.16	0.20	0.10
INT	CG	1.12	5.18	2.28	9.74	3.68	13.62
	ER	0.85	0.39	0.34	0.15	0.19	0.10
OLUMBUS							
INT	CG	1.26	5.39	2.56	10.13	2.36	4.95
	ER	0.84	0.41	0.34	0.16	0.19	0.11
INT	CG	1.21	5.17	2.46	9.72	3.97	13.59
	ER	0.82	0.39	0.33	0.15	0.19	0.10
OH DAYTON							
INT	CG	1.42	5.73	2.85	10.77	2.58	5.11
	ER	0.81	0.39	0.32	0.15	0.19	0.10
INT	CG	1.37	5.51	2.78	10.35	4.48	14.48
	ER	0.79	0.37	0.31	0.14	0.18	0.09
OH TOLEDO							
INT	CG	1.36	6.96	2.77	13.07	2.37	5.95
	ER	0.82	0.34	0.33	0.13	0.19	0.09
INT	CG	1.25	6.36	2.53	11.95	4.08	16.71
	ER	0.81	0.33	0.32	0.13	0.19	0.08
OH YOUNGSTOWN							
INT	CG	1.23	5.47	2.50	10.28	2.33	5.08
	ER	0.85	0.40	0.34	0.16	0.20	0.11
INT	CG	1.12	4.95	2.27	9.30	3.65	13.01
	ER	0.85	0.40	0.34	0.16	0.19	0.10
SD HIRON							
INT	CG	1.90	7.25	3.85	13.62	2.73	5.13
	ER	0.72	0.33	0.29	0.13	0.17	0.09
INT	CG	1.73	6.60	3.50	12.40	5.65	17.33
	ER	0.72	0.32	0.29	0.12	0.17	0.08
SD PIERRE							
INT	CG	2.05	3.75	4.16	7.05	2.73	2.46
	ER	0.70	0.50	0.28	0.21	0.17	0.13
INT	CG	1.97	3.61	4.00	6.78	5.44	9.48
	ER	0.68	0.49	0.27	0.19	0.16	0.12
*SD RAPID CITY							
INT	CG	1.64	7.21	3.34	13.54	2.05	4.42
	ER	0.76	0.33	0.31	0.13	0.18	0.09
INT	CG	1.64	7.21	3.34	13.54	5.38	18.93
	ER	0.73	0.30	0.29	0.11	0.17	0.08
SD SIOUX FALLS							
INT	CG	1.45	5.83	2.95	10.96	2.06	4.06
	ER	0.80	0.38	0.32	0.15	0.19	0.10
INT	CG	1.39	5.58	2.82	10.48	4.55	14.65
	ER	0.78	0.37	0.31	0.14	0.18	0.09
WI EAU CLAIRE							
INT	CG	1.19	5.56	4.85	10.44	3.53	4.15
	ER	0.15	0.40	0.21	0.16	0.16	0.10
INT	CG	2.15	5.01	4.37	9.41	7.05	13.16
	ER	0.65	0.40	0.26	0.16	0.16	0.10

Table III (continued)

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
WI	GREEN BAY					2.90	3.99
	TWNI CG	1.93	5.41	3.92	10.16	6.33	14.21
	ER	0.71	0.40	0.29	0.16	0.17	0.11
	DGNI CG	1.84	5.15	3.74	9.69	6.03	13.54
	ER	0.70	0.39	0.28	0.15	0.16	0.10
WI	LA CROSSE					2.14	4.15
	TWNI CG	1.37	5.40	2.78	10.14	4.48	14.18
	ER	0.82	0.40	0.33	0.16	0.19	0.11
	DGNI CG	1.24	4.91	2.53	9.23	4.07	12.90
	ER	0.81	0.40	0.32	0.16	0.19	0.10
*WI	MADISON					2.20	3.61
	TWNI CG	1.53	5.11	3.11	9.60	5.01	13.43
	ER	0.78	0.42	0.32	0.17	0.18	0.11
	DGNI CG	1.40	4.67	2.84	8.78	4.59	12.28
	ER	0.78	0.42	0.31	0.16	0.18	0.10
WI	MILWAUKEE					3.12	3.61
	TWNI CG	2.09	4.92	4.24	9.24	6.84	12.92
	ER	0.69	0.43	0.28	0.17	0.17	0.11
	DGNI CG	1.91	4.50	3.88	8.45	6.26	11.82
	ER	0.69	0.43	0.28	0.17	0.16	0.11
*AZ	PHOENIX					2.51	6.00
	TWNI CG	1.49	7.26	3.03	13.65	4.89	19.09
	ER	0.79	0.33	0.32	0.13	0.19	0.09
	DGNI CG	1.67	8.14	3.40	15.29	5.48	21.38
	ER	0.73	0.27	0.25	0.09	0.17	0.07
AZ	PRESCOTT					2.60	5.50
	TWNI CG	2.21	9.50	4.48	17.85	7.23	24.96
	ER	0.68	0.26	0.27	0.09	0.16	0.08
	DGNI CG	2.39	10.27	4.85	19.30	7.81	26.99
	ER	0.62	0.21	0.25	0.06	0.15	0.05
AZ	TUCSON					2.39	4.98
	TWNI CG	1.51	6.41	3.07	12.04	4.95	16.83
	ER	0.79	0.36	0.32	0.14	0.19	0.09
	DGNI CG	1.68	7.14	3.42	13.41	5.51	18.76
	ER	0.72	0.30	0.29	0.11	0.17	0.08
AZ	WINSLOW					2.60	5.45
	TWNI CG	2.11	8.98	4.28	16.88	6.90	23.60
	ER	0.69	0.27	0.28	0.10	0.17	0.08
	DGNI CG	2.25	9.58	4.56	18.00	7.35	25.17
	ER	0.64	0.23	0.26	0.07	0.15	0.05

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
AZ	YUMA					2.51	5.50
	TWNI CG	1.41	6.31	2.87	11.85	4.63	16.57
	ER	0.81	0.36	0.33	0.14	0.19	0.10
	DGNI CG	1.61	7.15	3.26	13.45	5.26	18.80
	ER	0.74	0.30	0.30	0.11	0.17	0.08
CA	ARCATA					3.42	3.69
	TWNI CG	3.11	6.82	6.31	12.81	10.17	17.92
	ER	0.58	0.34	0.24	0.13	0.15	0.09
	DGNI CG	3.29	7.22	6.68	13.57	10.77	18.97
	ER	0.53	0.30	0.21	0.11	0.13	0.08
CA	BAKERSFIELD					3.42	3.69
	TWNI CG	1.94	4.26	3.94	8.00	6.35	11.19
	ER	0.71	0.47	0.29	0.19	0.17	0.12
	DGNI CG	2.11	4.64	4.29	8.72	6.92	12.19
	ER	0.66	0.42	0.27	0.16	0.16	0.11
CA	CHINA LAKE					2.40	3.91
	TWNI CG	1.76	5.83	3.57	10.95	5.76	15.31
	ER	0.74	0.38	0.30	0.15	0.18	0.10
	DGNI CG	1.92	6.36	3.89	11.94	6.28	16.70
	ER	0.69	0.33	0.28	0.13	0.16	0.08
CA	DAGGETT					2.40	5.49
	TWNI CG	1.56	7.26	3.17	13.64	5.11	19.08
	ER	0.78	0.33	0.31	0.13	0.18	0.09
	DGNI CG	1.74	8.10	3.53	15.22	5.70	21.28
	ER	0.71	0.27	0.29	0.10	0.17	0.07
CA	EL TORO					2.40	3.91
	TWNI CG	1.72	5.69	3.49	10.70	5.62	14.96
	ER	0.75	0.39	0.30	0.16	0.18	0.10
	DGNI CG	1.94	6.42	3.94	12.07	6.35	16.88
	ER	0.68	0.33	0.27	0.12	0.16	0.08
CA	FRESNO					2.75	3.69
	TWNI CG	1.61	4.41	3.28	8.28	5.28	11.58
	ER	0.77	0.46	0.31	0.19	0.18	0.12
	DGNI CG	1.73	4.71	3.50	8.85	5.65	12.38
	ER	0.72	0.41	0.29	0.16	0.17	0.10
CA	LONG BEACH					1.96	3.91
	TWNI CG	1.34	5.45	2.73	10.24	4.40	14.32
	ER	0.82	0.40	0.33	0.16	0.19	0.11
	DGNI CG	1.51	6.14	3.07	11.54	4.95	16.13
	ER	0.76	0.34	0.30	0.13	0.18	0.09

Table III (continued)

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
*CA	LOS ANGELES						
	TWNI CG	1.90	8.83	3.85	16.59	2.40	5.49
	ER	0.72	0.27	0.29	0.10	0.17	0.08
	DGNI CG	2.14	9.97	4.35	18.73	7.01	26.18
	ER	0.65	0.22	0.26	0.07	0.16	0.05
CA	MOUNT SHASTA						
	TWNI CG	2.27	6.21	4.61	11.66	2.75	3.69
	ER	0.67	0.37	0.27	0.15	0.16	0.10
	DGNI CG	2.33	6.37	4.74	11.97	7.64	16.73
	ER	0.63	0.33	0.25	0.13	0.15	0.08
CA	NEEDLES						
	TWNI CG	1.62	4.11	3.28	7.72	2.80	3.50
	ER	0.77	0.48	0.31	0.19	0.18	0.12
	DGNI CG	1.83	4.65	3.71	8.73	5.98	12.21
	ER	0.70	0.42	0.28	0.16	0.17	0.11
CA	OAKLAND						
	TWNI CG	2.38	6.51	4.84	12.23	2.75	3.69
	ER	0.65	0.36	0.27	0.14	0.16	0.09
	DGNI CG	2.67	7.29	5.43	13.71	8.75	19.17
	ER	0.59	0.30	0.24	0.11	0.14	0.07
CA	POINT MUGU						
	TWNI CG	2.14	9.96	4.35	18.72	2.40	5.49
	ER	0.68	0.24	0.28	0.09	0.17	0.07
	DGNI CG	2.42	11.24	4.90	21.12	7.91	29.53
	ER	0.62	0.18	0.25	0.05	0.15	0.05
CA	RED BLUFF						
	TWNI CG	1.58	4.31	3.21	8.10	2.75	3.69
	ER	0.77	0.47	0.31	0.19	0.18	0.12
	DGNI CG	1.70	4.63	3.44	8.69	5.55	12.16
	ER	0.72	0.42	0.29	0.17	0.17	0.11
CA	SACRAMENTO						
	TWNI CG	1.70	3.21	3.45	6.03	2.75	2.55
	ER	0.75	0.55	0.30	0.22	0.18	0.14
	DGNI CG	1.85	3.49	3.76	6.56	6.06	9.17
	ER	0.70	0.49	0.28	0.20	0.16	0.12
CA	SAN DIEGO						
	TWNI CG	2.49	7.50	5.05	14.09	3.44	5.10
	ER	0.64	0.32	0.26	0.12	0.16	0.09
	DGNI CG	2.83	8.54	5.75	16.05	9.27	22.44
	ER	0.57	0.26	0.23	0.09	0.14	0.06

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
CA	SAN FRANCISCO						
	TWNI CG	3.02	6.63	6.13	12.46	3.42	3.69
	ER	0.59	0.35	0.24	0.14	0.15	0.09
	DGNI CG	3.34	7.34	6.79	13.79	10.95	19.29
	ER	0.53	0.30	0.21	0.11	0.13	0.07
CA	SANTA MARIA						
	TWNI CG	2.27	7.11	4.61	13.35	2.40	3.69
	ER	0.67	0.33	0.27	0.13	0.14	0.09
	DGNI CG	2.52	7.89	5.12	14.83	8.26	20.74
	ER	0.61	0.28	0.24	0.10	0.15	0.07
CA	SUNNYVALE						
	TWNI CG	1.99	5.42	4.03	10.18	2.75	3.69
	ER	0.71	0.40	0.29	0.16	0.17	0.11
	DGNI CG	2.22	6.05	4.50	11.37	7.26	15.90
	ER	0.64	0.35	0.26	0.13	0.15	0.09
CO	COLORADO SPRINGS						
	TWNI CG	1.81	6.69	3.67	12.58	1.94	3.53
	ER	0.73	0.35	0.30	0.14	0.18	0.09
	DGNI CG	1.91	7.06	3.87	13.26	6.24	18.54
	ER	0.69	0.31	0.28	0.11	0.16	0.08
*CO	DENVER						
	TWNI CG	1.83	7.26	3.72	13.65	2.06	4.01
	ER	0.73	0.33	0.30	0.13	0.17	0.09
	DGNI CG	1.93	7.64	3.91	14.35	6.31	20.07
	ER	0.68	0.28	0.28	0.10	0.16	0.07
CO	EAGLE						
	TWNI CG	2.01	8.04	4.08	15.11	2.04	4.01
	ER	0.70	0.30	0.29	0.11	0.17	0.09
	DGNI CG	2.01	8.04	4.08	15.11	6.59	21.13
	ER	0.67	0.27	0.27	0.10	0.16	0.07
CO	GRAND JUNCTION						
	TWNI CG	1.65	6.59	3.35	12.39	2.04	4.01
	ER	0.75	0.35	0.31	0.14	0.18	0.09
	DGNI CG	1.69	6.76	3.43	12.70	5.53	17.76
	ER	0.72	0.32	0.29	0.12	0.17	0.08
CO	PUEBLO						
	TWNI CG	1.54	5.85	3.13	11.00	1.84	3.43
	ER	0.78	0.38	0.32	0.15	0.18	0.10
	DGNI CG	1.62	6.14	3.29	11.55	5.30	16.14
	ER	0.74	0.34	0.30	0.13	0.17	0.09

Table III (continued)

		OWNERSHIP PERIOD					
		7 YR	15 YR	30 YR	7 YR	15 YR	30 YR
		GAS	ELEC	GAS	ELEC	GAS	ELEC
ISE							
VI CG	1.78	4.00	3.61	7.51	5.83	10.50	
VI ER	0.74	0.49	0.30	0.20	0.18	0.13	
VI CG	1.78	4.00	3.61	7.51	5.83	10.50	
VI ER	0.71	0.46	0.28	0.18	0.17	0.11	
HISTON							
VI CG	1.42	2.37	2.89	4.45	2.30	1.88	
VI ER	0.81	0.63	0.32	0.26	0.19	0.16	
VI CG	1.38	2.29	2.79	4.30	4.50	6.01	
VI ER	0.78	0.61	0.31	0.25	0.18	0.15	
CAVELLO							
VI CG	1.90	4.27	3.86	8.02	2.30	2.54	
VI ER	0.72	0.47	0.29	0.19	6.22	11.22	
VI CG	1.90	4.27	3.86	8.02	6.22	11.22	
VI ER	0.69	0.44	0.28	0.17	0.16	0.11	
LLINGS							
VI CG	1.33	4.72	2.69	8.87	1.67	2.92	
VI ER	0.83	0.44	0.33	0.18	4.34	12.40	
VI CG	1.28	4.55	2.60	8.55	0.19	0.11	
VI ER	0.81	0.42	0.32	0.17	4.19	11.96	
T BANK							
VI CG	1.87	3.86	3.80	7.26	2.12	2.15	
VI ER	0.72	0.50	0.29	0.20	6.13	10.15	
VI CG	1.80	3.71	3.63	6.98	0.17	0.13	
VI ER	0.70	0.48	0.27	0.19	5.89	9.75	
LLON							
VI CG	2.10	5.43	4.27	10.70	2.30	2.92	
VI ER	0.69	0.40	0.28	0.16	6.88	14.26	
VI CG	2.10	5.43	4.27	10.70	0.17	0.11	
VI ER	0.66	0.38	0.27	0.15	6.88	14.26	
ASGOW							
VI CG	1.41	5.00	2.85	9.40	1.67	2.92	
VI ER	0.81	0.43	0.33	0.17	4.60	13.14	
VI CG	1.12	3.98	2.27	7.47	0.19	0.11	
VI ER	0.81	0.43	0.33	0.17	3.66	10.44	
EAT FALLS							
VI CG	1.74	4.79	3.54	9.00	2.16	2.92	
VI ER	0.74	0.44	0.30	0.18	5.70	12.59	
VI CG	1.68	4.62	3.41	8.68	0.18	0.11	
VI ER	0.72	0.42	0.29	0.17	5.50	12.13	

		OWNERSHIP PERIOD					
		7 YR	15 YR	30 YR	7 YR	15 YR	30 YR
		GAS	ELEC	GAS	ELEC	GAS	ELEC
MT HELENA							
THNI CG	1.84	4.75	3.73	8.93	2.30	2.92	
THNI ER	0.73	0.44	0.30	0.18	6.02	12.48	
DGNI CG	1.77	4.57	3.59	8.58	0.17	0.11	
DGNI ER	0.71	0.42	0.29	0.17	5.79	12.00	
MT LEWISTOWN							
THNI CG	1.93	4.99	3.92	9.37	2.30	2.92	
THNI ER	0.71	0.43	0.29	0.17	6.32	13.10	
DGNI CG	1.85	4.79	3.76	9.00	0.17	0.11	
DGNI ER	0.70	0.41	0.28	0.16	6.07	12.58	
MT MILES CITY							
THNI CG	1.29	7.22	2.61	13.56	1.67	4.60	
THNI ER	0.84	0.33	0.34	0.13	4.22	18.96	
DGNI CG	1.19	6.65	2.41	12.50	0.19	0.09	
DGNI ER	0.83	0.32	0.33	0.12	3.89	17.48	
MT MISSOULA							
THNI CG	1.57	4.06	3.19	7.63	2.30	2.92	
THNI ER	0.78	0.48	0.31	0.20	5.14	10.66	
DGNI CG	1.43	3.69	2.90	6.94	0.18	0.12	
DGNI ER	0.77	0.48	0.31	0.19	4.68	9.70	
NV ELKO							
THNI CG	2.31	5.15	4.69	9.69	2.40	2.63	
THNI ER	0.66	0.42	0.27	0.17	7.57	13.54	
DGNI CG	2.38	5.31	4.83	9.97	0.16	0.11	
DGNI ER	0.62	0.38	0.25	0.15	7.79	13.94	
NV ELY							
THNI CG	1.93	8.56	3.93	16.09	1.87	4.07	
THNI ER	0.71	0.28	0.29	0.10	6.33	22.50	
DGNI CG	2.00	8.83	4.05	16.59	0.17	0.08	
DGNI ER	0.67	0.25	0.27	0.08	6.53	23.20	
*NV LAS VEGAS							
THNI CG	1.30	7.42	2.64	13.94	1.87	5.24	
THNI ER	0.83	0.32	0.33	0.12	4.26	19.49	
DGNI CG	1.41	8.06	2.87	15.15	0.19	0.09	
DGNI ER	0.78	0.27	0.31	0.10	4.63	21.19	
NV LOVELOCK							
THNI CG	2.29	9.93	4.65	18.66	2.40	5.11	
THNI ER	0.66	0.24	0.27	0.09	7.50	26.09	
DGNI CG	2.40	10.40	4.87	19.54	0.16	0.07	
DGNI ER	0.62	0.20	0.25	0.06	7.86	27.32	

Table III (continued)

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
NV	RENO						
	TWNI CG	3.11	10.47	6.32	19.68	10.19	27.51
	ER	0.58	0.23	0.24	0.09	0.14	0.07
	DGNI CG	3.26	10.96	4.62	20.60	10.67	28.81
	ER	0.54	0.19	0.22	0.06	0.13	0.05
NV	TIONOPAH						
	TWNI CG	3.05	10.25	6.18	19.25	9.97	26.92
	ER	0.58	0.24	0.24	0.09	0.15	0.07
	DGNI CG	3.19	10.72	6.47	20.15	10.44	28.18
	ER	0.54	0.20	0.22	0.06	0.13	0.05
NV	WINNEMUCCA						
	TWNI CG	2.23	9.01	4.65	16.93	7.50	23.67
	ER	0.66	0.27	0.27	0.10	0.16	0.08
	DGNI CG	2.35	9.25	4.77	17.38	7.70	24.30
	ER	0.63	0.23	0.25	0.08	0.15	0.06
NV	YUCCA FLATS						
	TWNI CG	1.47	5.19	2.95	9.75	4.82	13.63
	ER	0.80	0.42	0.32	0.17	0.19	0.11
	DGNI CG	1.62	5.70	3.29	10.72	5.30	14.99
	ER	0.74	0.36	0.30	0.14	0.17	0.09
*NM	ALBUQUERQUE						
	TWNI CG	1.72	9.19	3.49	17.28	5.63	24.16
	ER	0.75	0.26	0.30	0.10	0.18	0.08
	DGNI CG	1.83	9.77	3.71	18.36	5.98	25.68
	ER	0.70	0.22	0.28	0.07	0.17	0.05
NM	CLAYTON						
	TWNI CG	1.86	9.80	3.78	18.41	6.10	25.75
	ER	0.72	0.25	0.29	0.09	0.17	0.07
	DGNI CG	2.00	10.50	4.05	19.72	6.54	27.58
	ER	0.67	0.20	0.27	0.06	0.16	0.05
NM	FARMINGTON						
	TWNI CG	1.90	9.08	3.85	17.07	6.22	23.87
	ER	0.72	0.27	0.29	0.10	0.17	0.08
	DGNI CG	1.99	9.53	4.05	17.92	6.53	25.05
	ER	0.67	0.23	0.27	0.07	0.16	0.05
NM	ROSWELL						
	TWNI CG	1.61	7.90	3.26	14.85	5.25	20.76
	ER	0.77	0.30	0.31	0.11	0.18	0.09
	DGNI CG	1.73	8.51	3.51	15.99	5.66	22.37
	ER	0.72	0.26	0.29	0.09	0.17	0.06

		OWNERSHIP PERIOD					
		7 YR		15 YR		30 YR	
		GAS	ELEC	GAS	ELEC	GAS	ELEC
NM	TRUTH OR CONSEQUENCES						
	TWNI CG	1.64	5.69	3.34	10.70	5.38	14.96
	ER	0.76	0.39	0.31	0.16	0.18	0.10
	DGNI CG	1.79	6.19	3.62	11.62	5.84	16.25
	ER	0.71	0.34	0.28	0.13	0.17	0.09
NM	TUCUMCARI						
	TWNI CG	1.69	6.12	3.43	11.49	5.53	16.07
	ER	0.75	0.37	0.31	0.15	0.18	0.10
	DGNI CG	1.82	6.60	3.70	12.40	5.96	17.34
	ER	0.70	0.32	0.28	0.12	0.17	0.08
NM	ZUNI						
	TWNI CG	1.98	10.59	4.02	19.91	6.48	27.84
	ER	0.71	0.23	0.29	0.09	0.17	0.07
	DGNI CG	2.08	11.14	4.22	20.93	6.81	29.26
	ER	0.66	0.19	0.27	0.05	0.16	0.05
OR	ASTORIA						
	TWNI CG	3.48	4.55	7.07	8.55	11.41	11.95
	ER	0.55	0.45	0.22	0.18	0.14	0.12
	DGNI CG	3.58	4.68	7.27	8.79	11.73	12.29
	ER	0.51	0.42	0.20	0.16	0.13	0.10
OR	BURNS						
	TWNI CG	3.94	5.10	8.00	9.58	12.90	13.39
	ER	0.51	0.42	0.21	0.17	0.13	0.11
	DGNI CG	3.94	5.10	8.00	9.58	12.90	13.39
	ER	0.48	0.39	0.19	0.15	0.12	0.10
OR	MEDFORD						
	TWNI CG	2.30	4.00	4.67	7.52	7.54	10.51
	ER	0.66	0.49	0.27	0.20	0.16	0.13
	DGNI CG	2.37	4.12	4.81	7.74	7.76	10.83
	ER	0.62	0.45	0.25	0.18	0.15	0.11
OR	NORTH BEND						
	TWNI CG	4.22	5.51	8.56	10.35	13.81	14.47
	ER	0.49	0.40	0.20	0.16	0.13	0.10
	DGNI CG	4.49	5.86	9.10	11.00	14.68	15.39
	ER	0.45	0.35	0.18	0.14	0.11	0.09
OR	PENDLETON						
	TWNI CG	2.34	3.74	4.74	7.03	7.65	9.83
	ER	0.66	0.50	0.27	0.21	0.16	0.13
	DGNI CG	2.34	3.74	4.74	7.03	7.65	9.83
	ER	0.63	0.48	0.25	0.19	0.15	0.12

Table III (continued)

		OWNERSHIP PERIOD					
		GAS	7 YR ELEC	GAS	15 YR ELEC	GAS	30 YR ELEC
*OR	PORTLAND						
	TWNI CG	2.89	3.74	5.86	7.03	4.83	3.08
	ER	0.60	0.50	0.24	0.21	0.15	0.13
	DGNI CG	2.89	3.74	5.86	7.03	4.83	3.08
	ER	0.57	0.48	0.23	0.19	0.14	0.12
OR	REDMOND						
	TWNI CG	3.47	5.54	7.03	10.42	3.94	3.10
	ER	0.55	0.40	0.22	0.16	0.14	0.10
	DGNI CG	3.47	5.54	7.03	10.42	3.94	3.10
	ER	0.52	0.37	0.21	0.14	0.13	0.09
OR	SALEM						
	TWNI CG	3.01	3.91	6.12	7.35	4.83	3.08
	ER	0.59	0.49	0.24	0.20	0.15	0.13
	DGNI CG	3.11	4.03	6.30	7.57	4.83	3.08
	ER	0.55	0.46	0.22	0.18	0.13	0.11
UT	BRYCE CANYON						
	TWNI CG	2.03	12.61	4.12	23.70	1.78	5.44
	ER	0.70	0.18	0.28	0.08	0.17	0.05
	DGNI CG	2.09	13.01	4.25	24.44	1.85	5.44
	ER	0.66	0.15	0.27	0.04	0.16	0.03
UT	CEDAR CITY						
	TWNI CG	1.62	10.05	3.28	18.90	1.78	5.44
	ER	0.77	0.24	0.31	0.09	0.18	0.07
	DGNI CG	1.70	10.58	3.45	19.88	1.85	5.44
	ER	0.72	0.20	0.29	0.06	0.17	0.05
*UT	SALT LAKE CITY						
	TWNI CG	1.45	8.04	2.95	15.11	1.78	4.85
	ER	0.80	0.30	0.32	0.11	0.19	0.09
	DGNI CG	1.49	8.28	3.03	15.55	1.85	4.85
	ER	0.76	0.26	0.30	0.09	0.18	0.06
WA	OLYMPIA						
	TWNI CG	2.59	3.01	5.24	5.66	4.01	2.29
	ER	0.63	0.56	0.26	0.23	0.16	0.14
	DGNI CG	2.51	2.92	5.10	5.48	3.94	2.29
	ER	0.61	0.54	0.25	0.22	0.15	0.13
*WA	SEATTLE-TACOMA						
	TWNI CG	2.51	1.41	5.10	2.66	4.01	1.11
	ER	0.64	0.78	0.26	0.32	0.16	0.18
	DGNI CG	2.51	1.41	5.10	2.66	4.01	1.11
	ER	0.61	0.75	0.25	0.30	0.15	0.17

		OWNERSHIP PERIOD					
		GAS	7 YR ELEC	GAS	15 YR ELEC	GAS	30 YR ELEC
WA	SPOKANE						
	TWNI CG	2.17	2.53	4.39	4.75	3.24	1.86
	ER	0.68	0.61	0.28	0.25	0.17	0.15
	DGNI CG	2.08	2.43	4.22	4.56	3.17	1.86
	ER	0.66	0.60	0.27	0.24	0.16	0.14
WA	WHIDBEY						
	TWNI CG	2.97	2.09	6.03	3.93	4.01	1.79
	ER	0.59	0.67	0.24	0.27	0.15	0.16
	DGNI CG	2.97	2.09	6.03	3.93	4.01	1.79
	ER	0.56	0.64	0.23	0.26	0.14	0.15
WA	YAKIMA						
	TWNI CG	2.17	3.38	4.41	6.35	3.19	2.44
	ER	0.68	0.53	0.28	0.22	0.17	0.14
	DGNI CG	2.09	3.26	4.25	6.12	3.06	2.44
	ER	0.66	0.51	0.27	0.21	0.16	0.13
WY	CASPER						
	TWNI CG	2.42	5.54	4.91	10.40	2.57	2.89
	ER	0.65	0.40	0.26	0.16	0.16	0.10
	DGNI CG	2.50	5.71	5.06	10.73	2.64	2.89
	ER	0.61	0.36	0.25	0.14	0.15	0.09
*WY	CHEYENNE						
	TWNI CG	0.57	4.87	1.15	9.15	0.59	2.49
	ER	1.10	0.43	0.43	0.17	0.24	0.11
	DGNI CG	0.58	5.01	1.19	9.42	0.61	2.49
	ER	1.06	0.40	0.41	0.16	0.23	0.10
WY	ROCK SPRINGS						
	TWNI CG	1.83	5.79	3.72	10.88	1.86	2.89
	ER	0.73	0.39	0.30	0.15	0.17	0.10
	DGNI CG	1.83	5.79	3.72	10.88	1.86	2.89
	ER	0.70	0.36	0.28	0.14	0.16	0.09
WY	SHERIDAN						
	TWNI CG	1.37	4.08	2.77	7.67	1.68	2.47
	ER	0.82	0.48	0.33	0.20	0.19	0.12
	DGNI CG	1.37	4.08	2.77	7.67	1.68	2.47
	ER	0.79	0.45	0.31	0.18	0.18	0.11